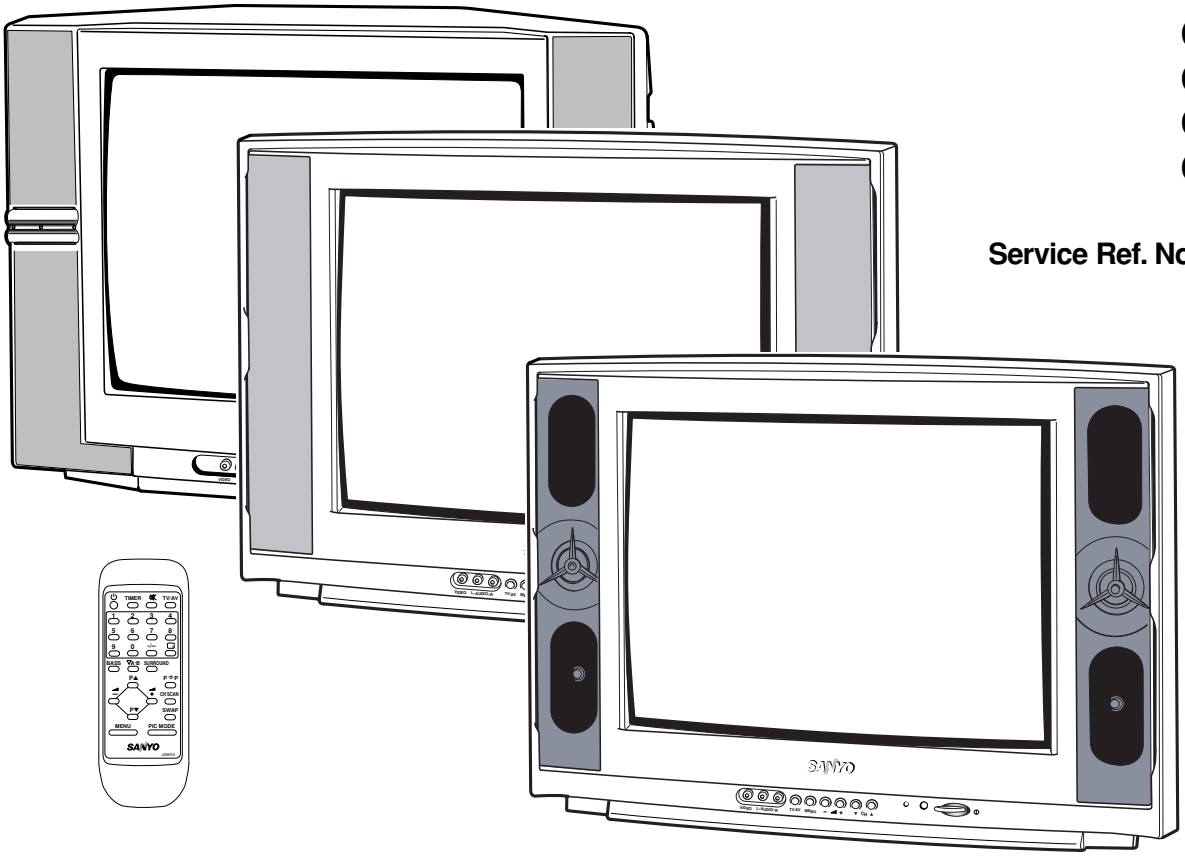
SANYO

FILE NO.

SERVICE MANUAL Colour Television

Model No. CM21KX81
CM21KX81A
CM21LX81
CM21LX81A
CM21MX81
CM21MX81A
(Middle East)

Service Ref. No. CM21KX81-00
CM21KX81A-00
CM21LX81-00
CM21LX81A-00
CM21MX81-00
CM21MX81A-00



Specifications

Power Source . . . . . AC110-240V, 50Hz/60Hz.
Colour System PAL/SECAM/NTSC4.43/NTSC/PAL-60Hz
Television System . . . . . B/G, D/K, K', I, M/M
Channel Coverage . . . . . VHF: E2-E12, R1-R12, K1-K9, A2-A13, J1-J12
UHF: 21-69, A14-A69, J13-J62
CATV: S1-S41, X, Y, Z, Z+1, Z+2
Video IF 38.0MHz
Aerial Input Impedance . . 75Ω
Ext. Terminals
Video inputs: Phono jack × 2 (1Vp - p, 75Ω)
Audio inputs: Phono jack (L/R) × 2(436mVrms, more than 40KΩ)
Video monitor outputs: Phono jack × 1(1Vp - p, 75Ω)
Audio monitor outputs: Phono jack (L/R) × 1(436mVrms, less than 600Ω)
Sound Output (RMS) . . . . 5W + 5W
Speaker . . . . . 6 cm × 12 cm × 2 pcs.
Dimensions . . . . . Model CM21KX81/A: 625 (W) × 460.5 (H) × 384 (D)mm
Model CM21LX81/A: 645 (W) × 465 (H) × 484 (D)mm
Model CM21MX81/A: 645 (W) × 465 (H) × 484 (D)mm
Weight . . . . . Model CM21KX81/A: approx. 21.2 Kg
Model CM21LX81/A, CM21MX81/A: approx. 20.8 Kg

Specifications subject to change without notice.

Product Code: 111358217 (CM21KX81)
111358247 (CM21KX81A)
111368013 (CM21LX81)
111368033 (CM21LX81A)
111368713 (CM21MX81)
111368733 (CM21MX81A)

Original Version

Chassis Series: AC5-G1

Give complete "SERVICE REF. NO." for parts order or servicing. It is shown on the rating plate at the cabinet back of the unit.

This T.V. receiver will not work properly in foreign countries where the television transmission system and power source differ from the design specifications. Refer to the specification table.

C4VW/C4VWA/C5RR/C5RRA/C6YR/C6YRA

REFERENCE NO. SM5110573

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Safety Notice

SAFETY PRECAUTIONS

1: An isolation transformer should be connected in the power line between the receiver and the AC line when a service is performed on the primary of the converter transformer of the set.

2: Comply with all caution and safety-related notes provided on the cabinet back, inside the cabinet, on the chassis or the picture tube.

3: When replacing a chassis in the cabinet, always be certain that all the protective devices are installed properly, such as, control knobs, adjustment covers or shields, barriers, isolation resistor-capacitor networks etc.. Before returning any television to the customer, the service technician must be sure that it is completely safe to operate without danger of electrical shock.

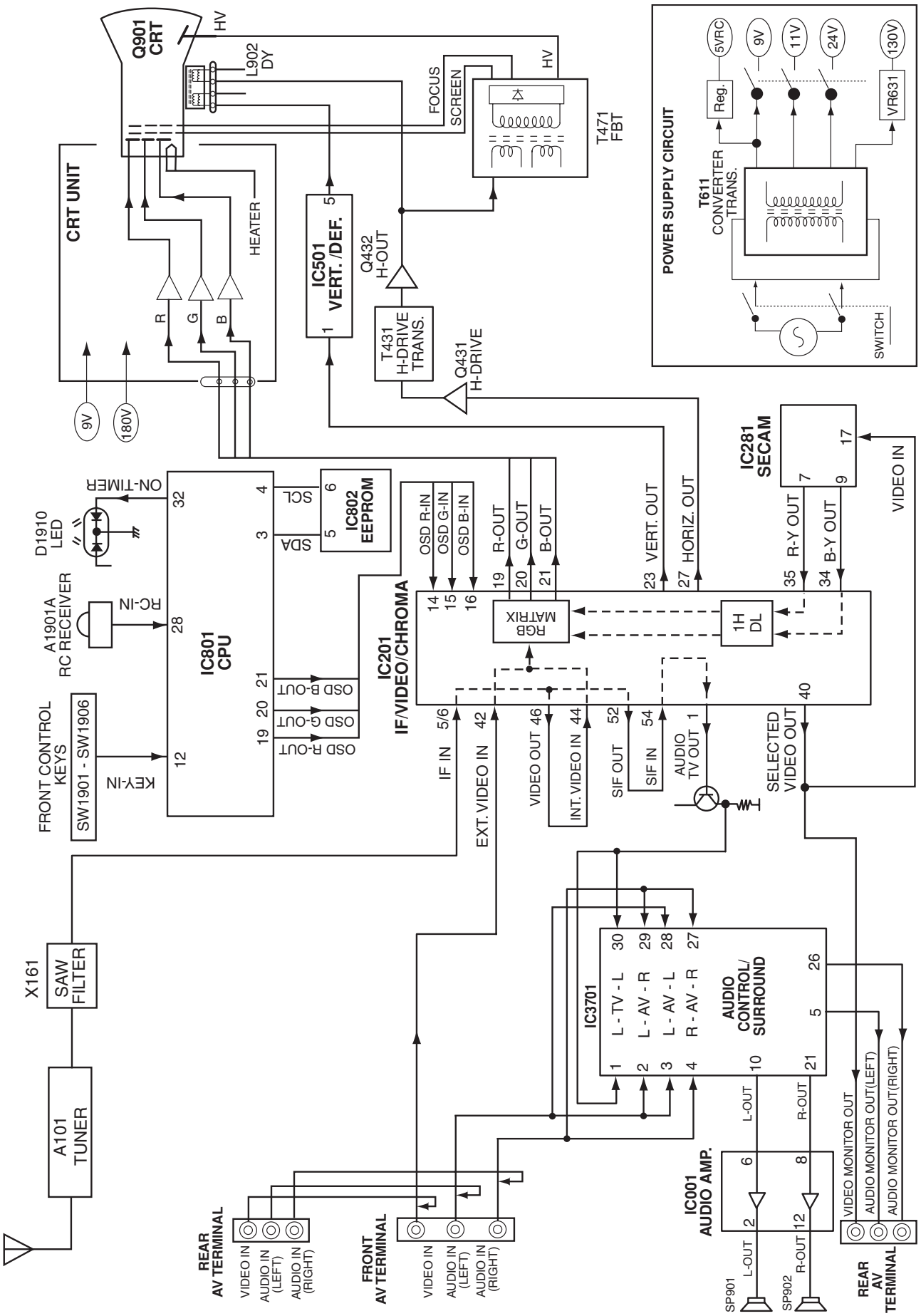
X-RADIATION PRECAUTION

The primary source of X-RADIATION in television receiver is the picture tube. The picture tube is specially constructed to limit X-RADIATION emissions. For continued X-RADIATION protection, the replacement tube must be the same type as the original including suffix letter. Excessive high voltage may produce potentially hazardous X - RADIATION. To avoid such hazards, the high voltage must be maintained within specified limit. Refer to this service manual, high voltage adjustment for specific high voltage limit. If high voltage exceeds specified limits, take necessary corrective action. Carefully follow the instructions for + B1 volt power supply adjustment, and high voltage check to maintain the high voltage within the specified limits.

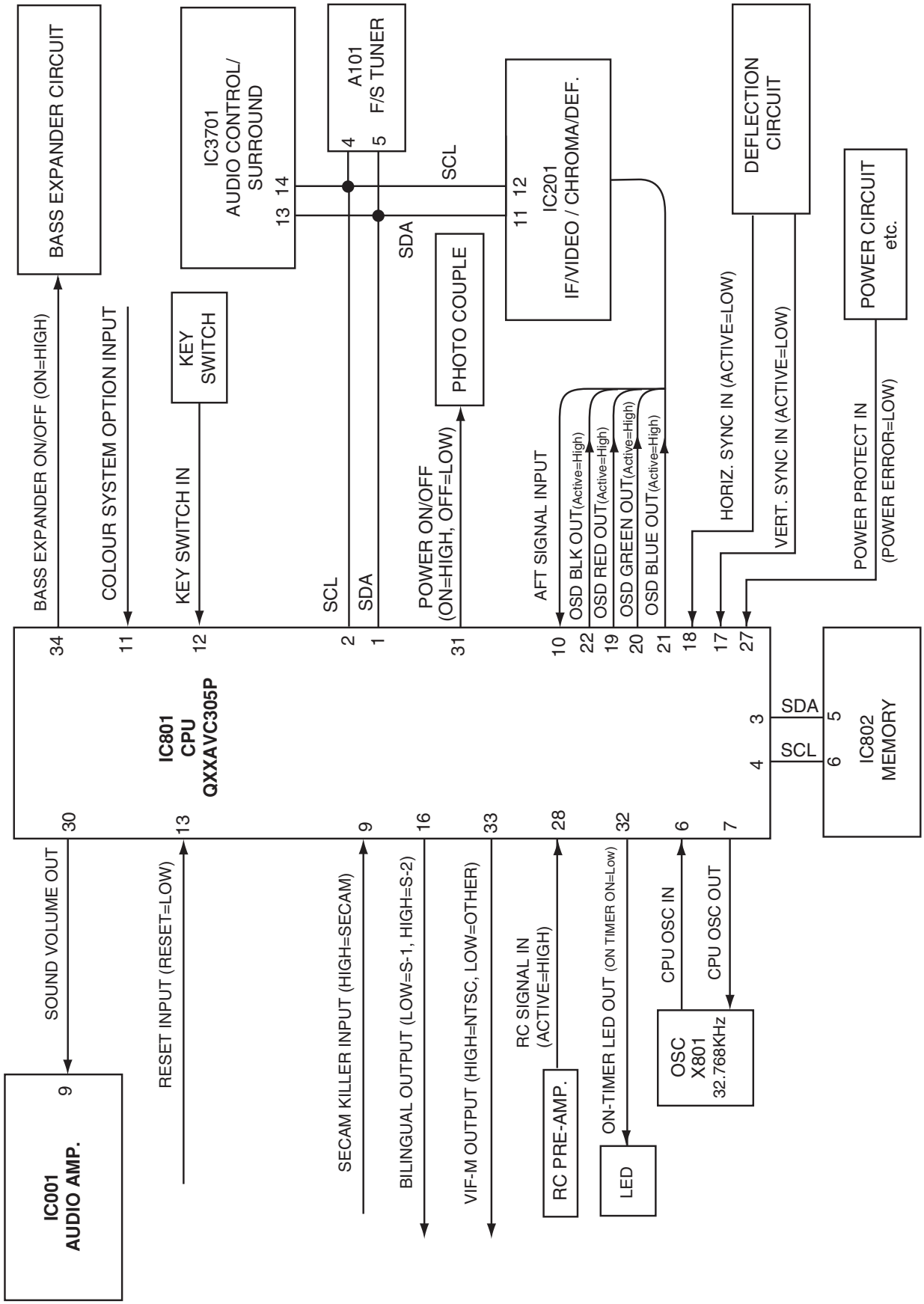
PRODUCT SAFETY NOTICE

Product safety should be considered when a component replacement is made in any area of a receiver. Components indicated by mark ⚠ in the parts list and the schematic diagram designate components in which safety can be of special significance. It is particularly recommended that only parts designated on the parts list in this manual be used for component replacement designated by mark ⚠ . No deviations from resistance wattage or voltage ratings may be made for replacement items designated by mark ⚠ .

Chassis Block Diagrams (**MAIN SIGNAL PROCESSING CIRCUIT**)

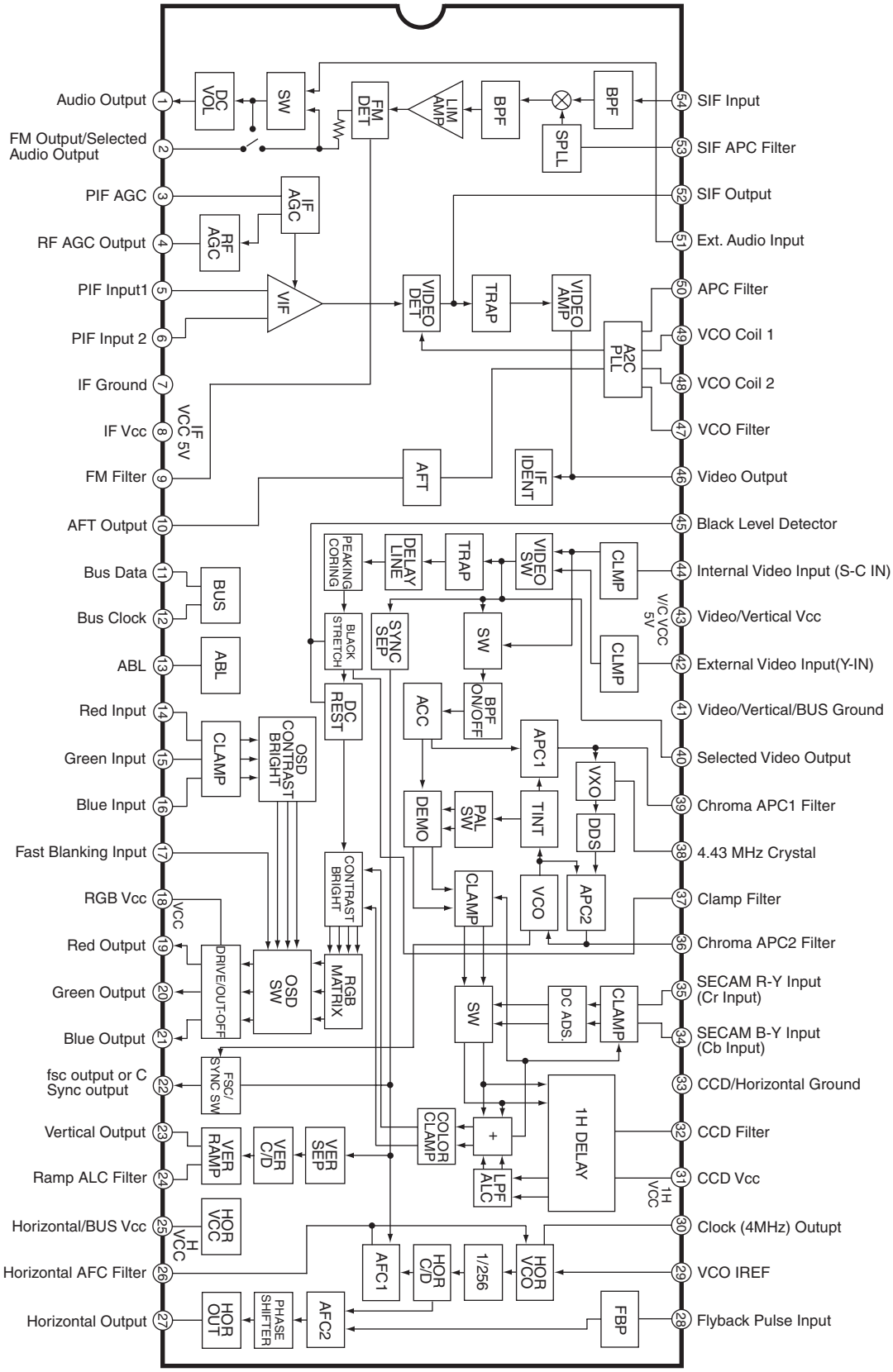


SYSTEM CONTROL



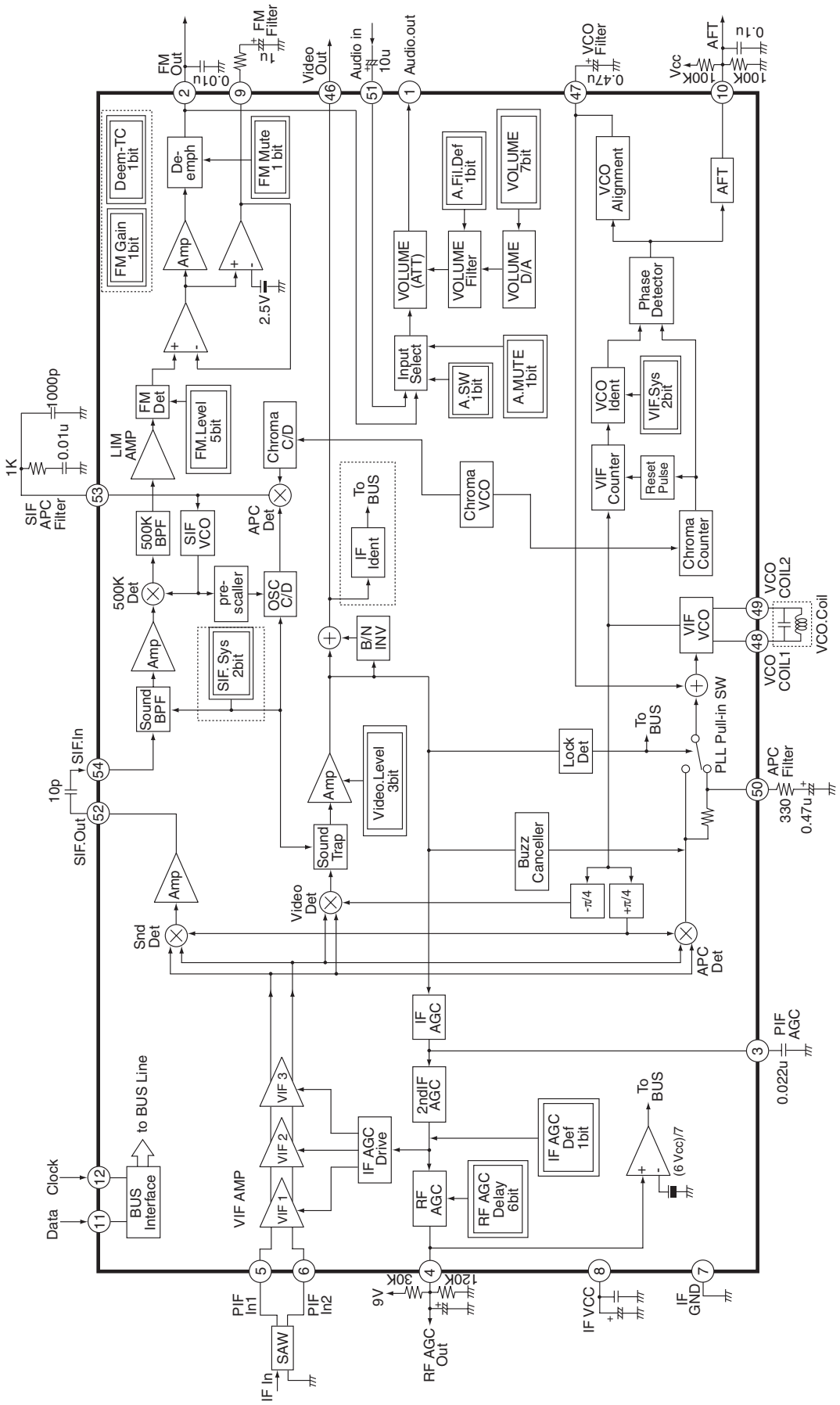
IC Block Diagrams

IC201 < IF/Video/Chroma/Def. > LA76818



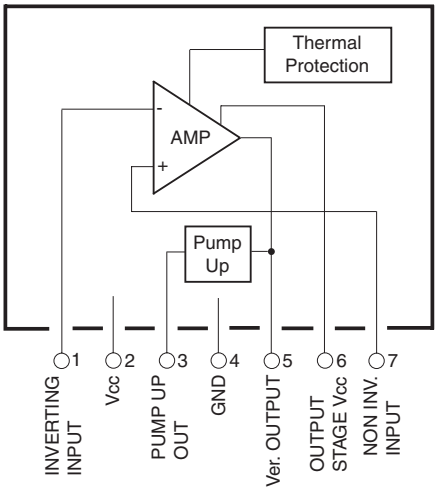
IC Block Diagrams

IC201 <IF System Block Diagram> LA76818

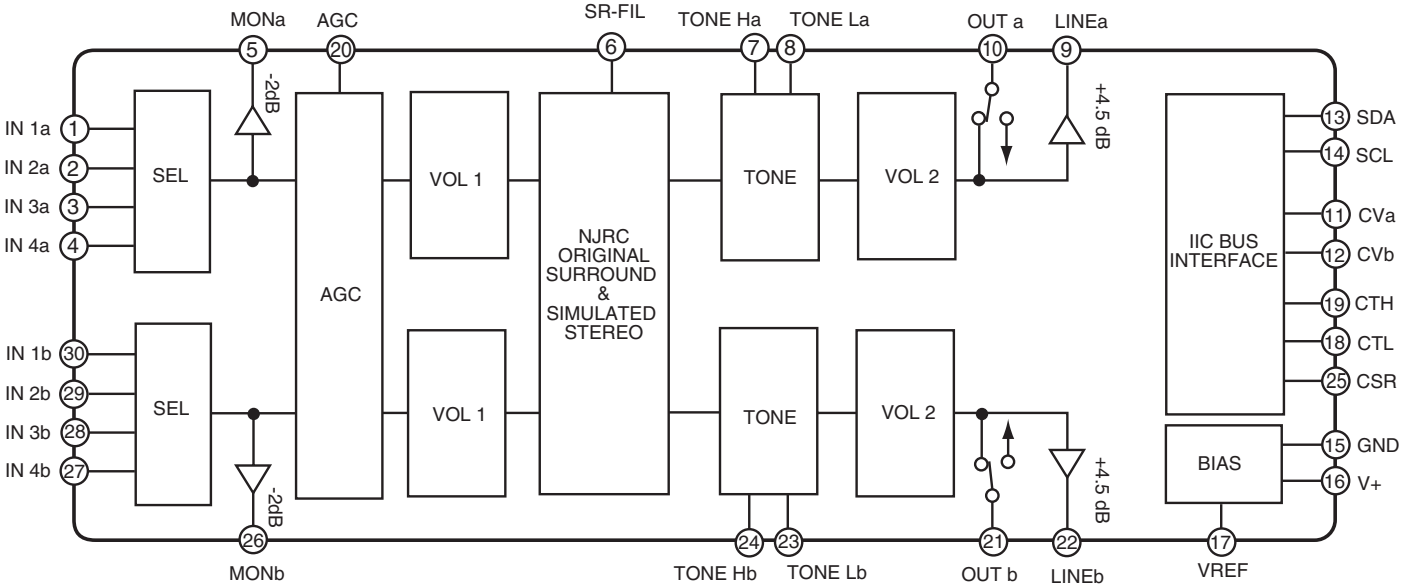


IC Block Diagrams

IC501 < Vertical Output > LA78040/TDA9302H



IC3701 < Audio Control / Surround > NJW1142MP



Service Information

■ Protection Circuit

This TV set has a built-in power supply protection circuit.
It is provided to protect the TV set in case of a power supply circuit malfunctions. When something abnormality occurs during TV reception, the TV set goes to the stand-by mode.

When an abnormality occurs during TV reception, it causes pin 27 of the CPU to go continually Low(less than 0.75V) for about one second. The CPU detects that this has occurred and outputs the signal from pin 31 to switch off the power supply lines.

Releasing the protective circuit and restoring power supply

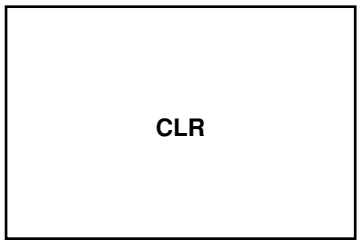
To release the protective circuit and restore power supply, turn the power to the TV set OFF and then ON again via either the main power switch or the ON-OFF button on the remote control. This will work only if the power supply trouble was temporary. If there is permanent trouble such as a damaged circuit, power cannot be restored and the circuit will have to be repaired.

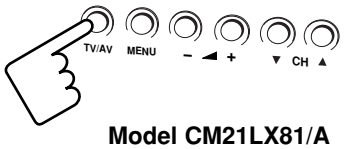
Service Adjustments with Replacing Memory IC(IC802)

Note: The CPU (IC801) and memory IC (IC802) store the service adjustments data and controls data for each circuit.When the Memory IC(IC802) is replaced, some of the service adjustments should be readjusted to obtain the best performance. The necessary service adjustments are carried out by using the RC handset. Please set up the TV set with following steps [1] to [2].

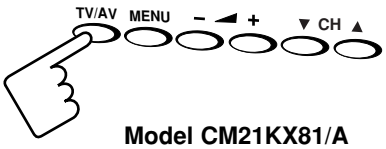
[1] Initializing Procedure

1. Put a new memory IC.
2. Turn on the TV set.
3. Press and hold the **TV/AV Selector** on the TV set for more than 2 seconds. The following picture appears on the screen.





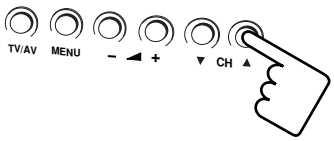
Model CM21LX81/A
CM21MX81/A

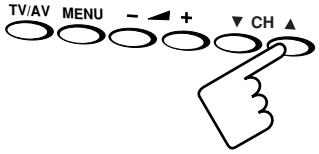


Model CM21KX81/A

Press and hold for more than 2 seconds

4. Press the **PROGRAMME UP** on the TV set while the above On-Screen Display is still on the screen. The following picture appears on the screen.





This completes the initialization of memory IC.

Following shows the initialized contents of memory data by this procedure.

- Plug & play : No executed
- Inhibit data : Cancelled
- Ch skip data : Cancelled
- Sound volume data : 10/63 steps.
- Volume Lock : OFF
- Tuning Lock : OFF
- Colour system : AUTO

[2] Required Service Adjustments

Readjust the following service adjustments.

Adjustments	Service Mode No. & Item
RF AGC	Item 01, RF AGC
Horizontal centre	Item 02, H-PHA
Vertical size	Item 04, V-SIZ
Vertical-S correction	Item 05, V-SCO
Vertical linearity	Item 06, V-LIN
Gray scale	Item 14-17, 19-21

Further adjustment please refer to page 12 and 13.

Service Adjustments with Replacing Memory IC(IC802)

Following table shows the initial values which have been stored in the CPU ROM, and items for the service adjustments.

Service mode adjustments table in CPU ROM

No.	ITEM	DATA RANGE	INITIAL SETUP DATA	DESCRIPTION
01	RFAGC	0~63	31	RF AGC Adj.
02	H-PHA	0~31	7	H-Phase (H-Centering) Adj. (50Hz)
03	V-POS	0~63	40	V-Position (V-Centering) Adj. (50Hz)Fixed.
04	V-SIZ	0~127	80	V-Size Adj. (50Hz)
05	V-SCO	0~31	7	V-S Correction (50Hz)
06	V-LIN	0~31	18	V-Linearity Adj. (50Hz)
07	H-P60	-16~+15	+5	H-PHASE Adj. (60Hz)
08	V-S60	-64~+32	0	V-Size Adj. (60Hz)
09	OSDHP	0~255	26	OSD H-Position Adj.
10	OSDC	0~127	45	OSD Contrast Adj.
11	V-SCP	0~7	7	Correction of the V-size accompanying brightness change.
12	H-SCP	0~7	7	Correction of the H-size accompanying brightness change.
13	SBIAS	0~127	105	Sub Bias Adj. (Do not change)
14	RBIAS	0~255	0	Red Bias Adj.
15	GBIAS	0~255	0	Green Bias Adj.
16	BBIAS	0~255	0	Blue Bias Adj.
17	RDRIV	0~127	64	Red Drive Adj.
18	GDRIV	0~15	8	Green Drive Adj.
19	BDRIV	00~127	64	Blue Drive Adj.
20	1-LINE APPEAR			White Balance Adj.
21	DRV			White Balance Adj.
22	B-YD	0~15	5	B-Y DC level Adj.
23	R-YD	0~15	5	R-Y DC level Adj.
24	B-YDN	-16~+15	0	NTSC B-Y DC level Adj.
25	R-YDN	-16~+15	0	NTSC R-Y DC level Adj.
26	SBDC	-16~+15	–8	SECAM B-Y DC level Adj.
27	SRDC	-16~+15	–5	SECAM R-Y DC level Adj.
28	G-YA	0,1	0	G-Y angle Adj.
29	RBGB	0~15	8	R-Y, B-Y Gain Blance Adj. (Do not change.)
30	RBAG	0~15	8	R-Y, B-Y Angle Adj. (Do not change.)
31	G-YAN	0,1	0	NTSC G-Y Angle Adj.
32	RBGBN	-16~+15	0	NTSC R-Y, B-Y Gain Balance Adj.
33	RBAGN	-16~+15	0	NTSC G-Y, B-Y Angle Adj.
34	COGV	0~3	0	Coring Gain Adj.
35	BLKS	0~3	3	Setting of Black stretch start.
36	BLKG	0~3	3	Setting of Black stretch gain.
37	BRTA	0,1	0	On and off of ABL.
38	BRST	0,1	0	Setting of ABL.
39	BRTH	0~7	0	Setting of ABL.
40	WPL	0~3	2	White peak limitter.
41	YGAM	0~3	0	Y Gamma setting.
42	PORW	0,1	0	Switching of Pre-shoot and Over shoot in AV mode.

No.	ITEM	DATA RANGE	INITIAL SETUP DATA	SCRIPTION
43	PORS	0~3	2	Pre-shoot/Over shoot Adj. in AV mode.
44	RFCO	0~3	0	RF Coring Gain Adj.
45	PORWN	0,1	0	Switching of RF Pre-shoot and Over shoot.
46	PORSN	0~3	0	RF Pre-shoot/Over shoot Adj.
47	TINT	-16~+15	0	RF Tint Adj.
48	TINT443	-16~+15	-12	NTSC 4.43 Tint Adj.
49	SHRF	-32~+31	0	RF Sharpness Adj.
50	TEXTC	-128~+127	0	OSD TEXT Contrast.
51	VOLUM	0~255	127	Volume Control Adj.
52	DEEM	0~1	0	De emphasis TC.
53	VIFSW	0~3	0	VIF System Switch.
54	SIFSW	0~3	1	SIF System Switch.
55	V-LVL	0~7	4	Video Level Adj.
56	FMLVL	0~31	16	FM Level Adj.
57	IFOM-S	0,1	0	Over Modulation Switch
58	IFMN-S	0,1	1	Audio Monitor Switch
59	IFTRAPS	0,1	1	SIF Trap Switch ON/OFF
60	IFMLVL	0~255	136	Video Level & Modulation
61	TRAP-T	0~7	4	Trap Test
62	H-FRQ	0~63	34	Horizontal Frequency
63	FBTS	0,1	0	FBT Blanking Switch
64	COOP	0~7	7	Color Killer Option
65	HBLKL	0~7	7	H-Blanking Control. (Left)
66	HBLKR	0~7	3	H-Blanking Control. (Right)
67	AFCRF	0,1	0	RF AFC gain & Gate Adj.
68	VSRF	0,1	0	RF Vert. Sync. Separation Adj.
69	CDMRF	0~7	0	RF Vert. Count-Down Circuit Adj.
70	AFCAV	0,1	1	AV AFC Gain & Gate Adj.
71	VSUAV	0,1	0	AV Vert Sync. Separation Adj.
72	CDMAV	0~7	0	AV Vert Count-Down Circuit Adj.
73	HLVDRF	0,1	1	H Lock, V Detect RF
74	HLVDAV	0,1	1	H Lock, V Detect AV
75	VCO-SW	0,1	0	C-VCO Adj. Switch
76	VCO-ADJ	0~3	3	C-VCO Adj.
77	CROSS-BW	0~3	0	Output Pattern Picture
78	AVNCON	0~127	64	AV Blue Back Signal Contrast
79	AVNBRI	0~127	64	AV Blue Back Signal Brightness
80	POMT	0~127	25	Power Mute Time Adj.
81	CHMT	0~31	10	Channel Change Mute time Agj.
82	SYST	0~15	5	The number of times that a colour system AUTO is judged.
83	S-STE	0~3	2	Stereo/Mono Option. 0=MONO, 1=SIMPLE AV STEREO, 2,3=AV STEREO
84	VOLTBL	0~1	1	Volume Table
85	MPP	0,1	0	Multi Personal Preference function on/off o=without M.P.P., 1=with M.P.P.

Service Adjustments with Replacing Memory IC(IC802)

No.	ITEM	DATA RANGE	INITIAL SETUP DATA	DESCRIPTION
86	TUNER	0,1	0	Tuner Option
87	AV123	0~3	0	AV1/AV2/AV3 Option, 0=AV only, 1=AV1, AV2, 2~3=AV1, AV2,AV3
88	OPT POS	0,1	1	Programme number Option, Position No. Option, 0=100 pos., 1=256 pos.
89	GAME	0,1	1	GAME Option, 0=without GAE, 1=with GAME
90	LANGUAGE	0,1	1	Language Option, 0=without Language, 1=with Language
91	OPT COL	0~7	5	Colour System Option, 0~1=PAL only, 2=VMT, 3=China/Indonesia, 4=3 System,5~7=Multi
92	OPT SIF	0~7	3	SIF System Option
93	OPT BASS	0~3	2	Bass Expander Option, 0=without BASS, 1~2=BASS EXPANDER, 3=WOOFER
94	OPT SURR	0,1	1	Surround Option, 0=without SURROUND, 1=with SURROUND
95	SUB-BT	0,1,2	0	Audio IC (NJW1142)Sub Bass Treble adj.
96	A-AGC	0,1,2	0	Audio IC (NJW1142) AGC adj.
300	R00	0~255	154	ROM Correction
301	R01	0~255	242	ROM Correction
302	R02	0~255	166	ROM Correction
303	R03	0~255	246	ROM Correction
304	R04	0~255	3	ROM Correction
305	R05	0~255	0	ROM Correction
306	R06	0~255	0	ROM Correction
307	R07	0~255	0	ROM Correction
308	R08	0~255	2	ROM Correction
309	R09	0~255	229	ROM Correction
310	R10	0~255	144	ROM Correction
311	R11	0~255	13	ROM Correction
312	R12	0~255	239	ROM Correction
313	R13	0~255	141	ROM Correction
314	R14	0~255	238	ROM Correction
315	R15	0~255	141	ROM Correction
316	R16	0~255	237	ROM Correction
317	R17	0~255	141	ROM Correction
318	R18	0~255	236	ROM Correction
319	R19	0~255	141	ROM Correction
320	R20	0~255	235	ROM Correction
321	R21	0~255	141	ROM Correction
322	R22	0~255	33	ROM Correction
323	R23	0~255	155	ROM Correction
324	R24	0~255	6	ROM Correction
325	R25	0~255	33	ROM Correction
326	R26	0~255	154	ROM Correction
327	R27	0~255	246	ROM Correction

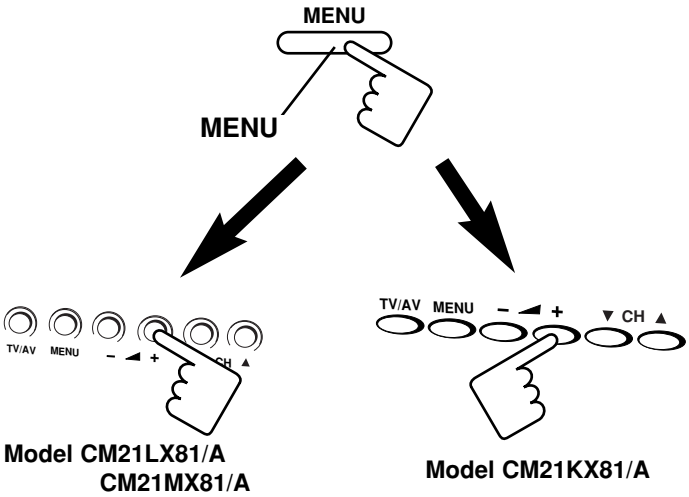
No.	ITEM	DATA RANGE	INITIAL SETUP DATA	DESCRIPTION
328	R28	0~255	0	ROM Correction
329	R29	0~255	0	ROM Correction
330	R30	0~255	0	ROM Correction
331	R31	0~255	0	ROM Correction
332	R32	0~255	0	ROM Correction
333	R33	0~255	0	ROM Correction
334	R34	0~255	0	ROM Correction
335	R35	0~255	0	ROM Correction
336	R36	0~255	0	ROM Correction
337	R37	0~255	0	ROM Correction
338	R38	0~255	0	ROM Correction
339	R39	0~255	0	ROM Correction
340	R40	0~255	107	ROM Correction
341	R41	0~255	127	ROM Correction
342	R42	0~255	7	ROM Correction
343	R43	0~255	3	ROM Correction
344	R44	0~255	234	ROM Correction
345	R45	0~255	144	ROM Correction
346	R46	0~255	3	ROM Correction
347	R47	0~255	33	ROM Correction
348	R48	0~255	166	ROM Correction
349	R49	0~255	249	ROM Correction
350	R50	0~255	33	ROM Correction
351	R51	0~255	167	ROM Correction
352	R52	0~255	34	ROM Correction
353	R53	0~255	0	ROM Correction
354	R54	0~255	0	ROM Correction
355	R55	0~255	0	ROM Correction
356	R56	0~255	0	ROM Correction
357	R57	0~255	0	ROM Correction
358	R58	0~255	0	ROM Correction
359	R59	0~255	0	ROM Correction
360	R60	0~255	0	ROM Correction
361	R61	0~255	0	ROM Correction
362	R62	0~255	0	ROM Correction
363	R63	0~255	0	ROM Correction
364	R64	0~255	0	ROM Correction
365	R65	0~255	0	ROM Correction
366	R12	0~255	0	ROM Correction
367	R13	0~255	0	ROM Correction
368	R68	0~255	0	ROM Correction
369	R69	0~255	0	ROM Correction
370	R70	0~255	0	ROM Correction
371	R71	0~255	0	ROM Correction
372	R72	0~255	160	ROM Correction

Notes: The initial value that the CPU writes down the CPU ROM data to the memory when replaced the memory IC. TV set may not operate correctly with this initial value. It is required to set up the fine adjustment for service adjustments described in the above.

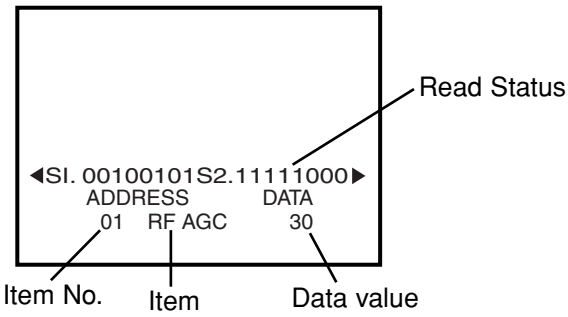
Service Adjustments with Replacing Memory IC(IC802)

[Entering to Service Mode]

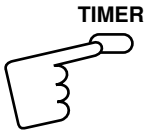
1. Press and hold the **MENU** button on the Remote Control and press the **VOLUME (+)** button on the TV set. Following setting items appears on the screen.



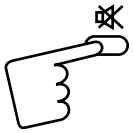
Display for [RF AGC] RF AGC adjustment



2. Select item by pressing the **TIMER** (Item No. UP) or **SOUND MUTE** (Item No. DOWN) button on the remote control handset.



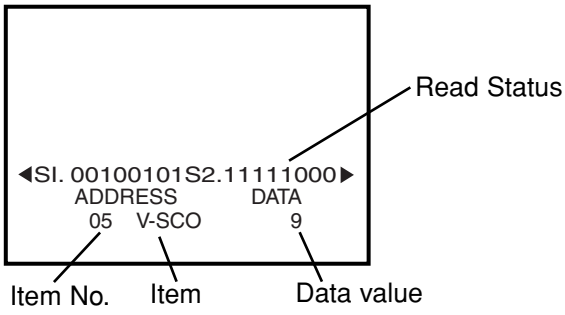
01➔02➔03➔04➔05.....96...



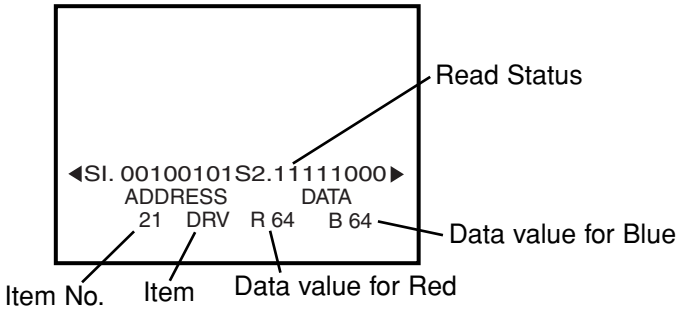
...92➔93➔94➔95➔96.....01

Example

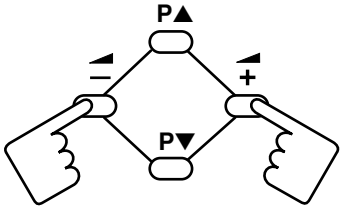
Display for [V-SCO] V-S Correction adjustment



Display for [DRV] White balance adjustment



3. Adjust data value by pressing the **VOLUME +** or **VOLUME –** button on the remote control handset.



To return to normal TV mode, press the **MENU** button on the TV set or the remote control handset.

Service Mode Adjustments

Following adjustments should be carried out when the memory IC is replaced. How to enter the service mode and adjust values, please refer to “ Entering to Service mode” on page 11.

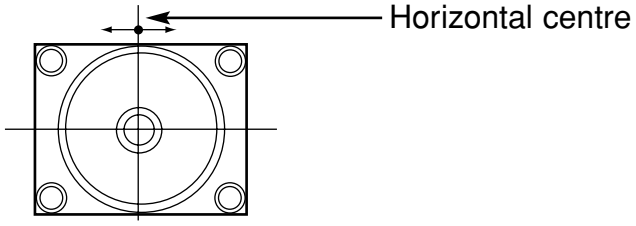
Item 01 [RF AGC] AGC

NOTE: Do not attempt this adjustment with weak signal.

(1) Tune the receiver to most clearest (or strongest) VHF station in your area. Set the brightness and contrast controls to maximum. Set the colour control to minimum.
(2) Select [RF AGC] in the service mode.
(3) Change value until the snow noise just disappears.
(4) Exit from service mode.

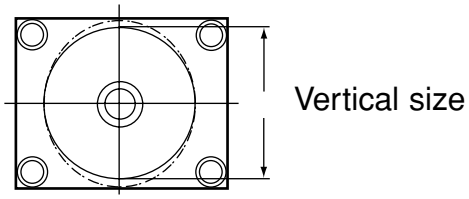
Item 02 [H-PHA] HORIZONTAL CENTRE

(1) Receive a monochrome circular pattern.
(2) Set the brightness and contrast to normal.
(3) Select [H-PHA] in the service mode.
(4) Change value to be optimum horizontal centre position.
(5) Exit from service mode.



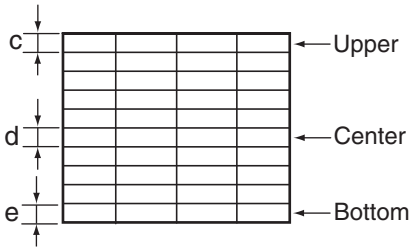
Item 04 [V-SIZ] VERTICAL SIZE

(1) Receive a monochrome circular pattern.
(2) Set the brightness and contrast to maximum.
(3) Select [V-SIZ] in the service mode.
(4) Change value to be optimum vertical size.
(5) Exit from service mode.



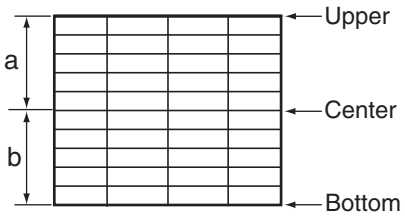
Item 05 [V-SCO] V-S CORRECTION

(1) Receive a crosshatch pattern.
(2) Select a picture mode of NATURAL by pressing the PICTURE MODE button.
(3) Select [V-SCO] in the service mode.
(4) Adjust Vertical S-letter Correction so that the difference of “c”, “d” and “e” becomes less than 2 mm by pressing the VOLUME + or - button.
(5) Confirm Vertical Linearity and adjust Vertical Center then Vertical Size.
(6) Exit from service mode.



Item 06 [V-LIN] VERTICAL LINEARITY

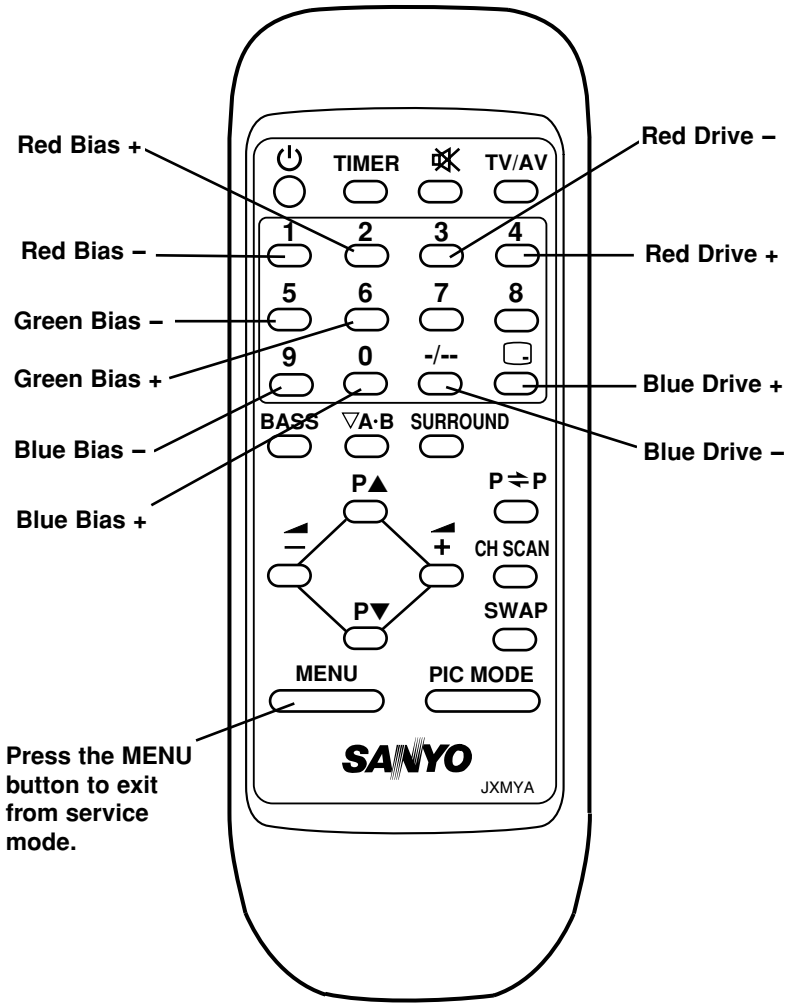
(1) Receive a crosshatch pattern.
(2) Select a picture mode of NATURAL by pressing the PICTURE MODE button.
(3) Select [V-LIN] in the service mode.
(4) Adjust Vertical Linearity so that the difference of “a” and “b” becomes less than 3mm by pressing VOLUME + or - button.
(5) Exit from service mode.

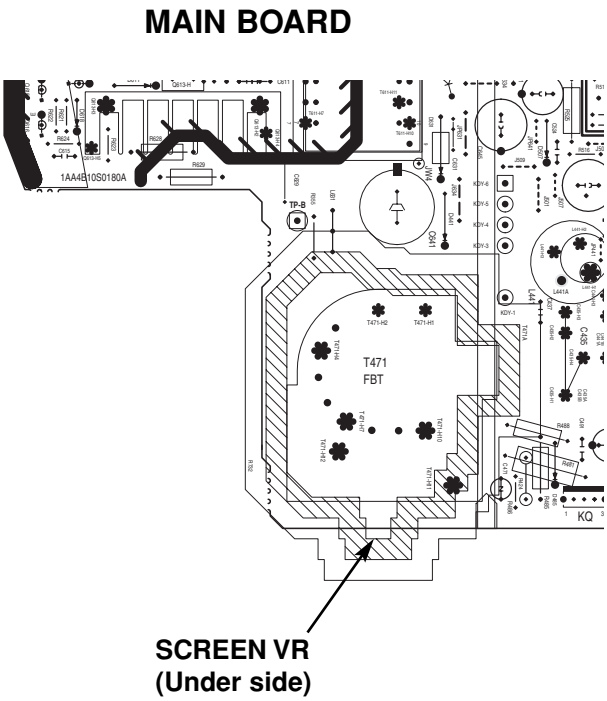


Items 14-17, 19-21 GREY SCALE

(1) Receive the monochrome circular pattern.
(2) Set the brightness and colour to normal, contrast to maximum.
(3) Enter to the service mode.
(4) Set each value of Item-**14 RBIAS, 15 GBIAS, 16 BBIAS, 17 RDRIV** and **19 BDRIV** mode to 64.
(5) Select Item-**20** mode to be one horizontal scanning line and turn the screen volume on the FBT to obtain just visible one coloured line.
(6) Press the **1 (Red Bias –)**, **2 (Red Bias +)**, **5 (Green Bias –)**, **6 (Green Bias +)**, **9 (Blue Bias –)** or **0 (Blue Bias +) button** to adjust the brightness of each colour until a dim white line produced. Please see the control button allocations in this mode.
(7) Select Item-**21 DRV** mode to enter the white balance adjusting mode.
(8) Press the **3 (Red Drive –)**, **4 (Red Drive +)**, **-/-- (Blue Drive –)** or **RECALL (Blue Drive +) button** alternately to produce normal black and white picture.
(9) Exit from the service mode.
(10) Check for proper grey scale tracking at all brightness levels.

NOTE: If the grey scale adjustment is made after picture tube replacement, check the high voltage.





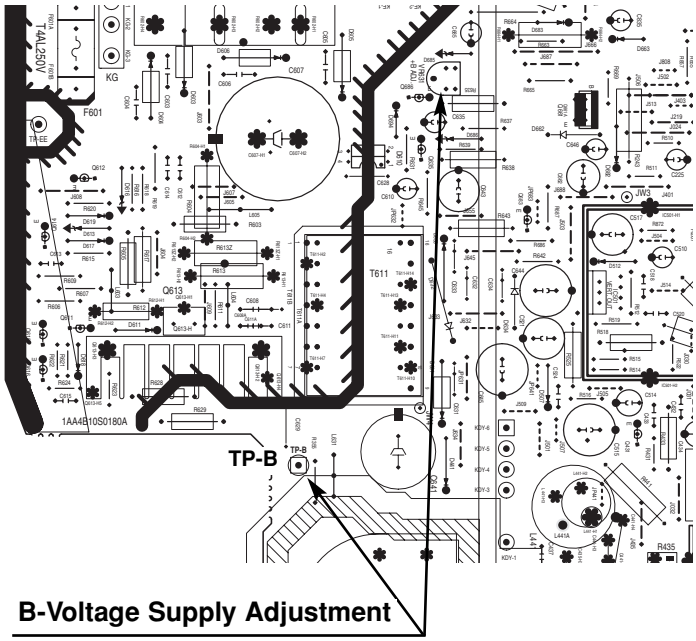
Service Adjustments

Following adjustments are not required to readjust when replacing the memory IC.

B-VOLTAGE SUPPLY CHECKING

(1) Connect DC meter to TP-B and the ground.
(2) Tune the receiver to an active channel and synchronized picture. Select NATURAL picture mode by pressing the **PICTURE MODE** button on the remote control.
(3) Adjust B-voltage to be 130 ± 1V DC by using VR631.

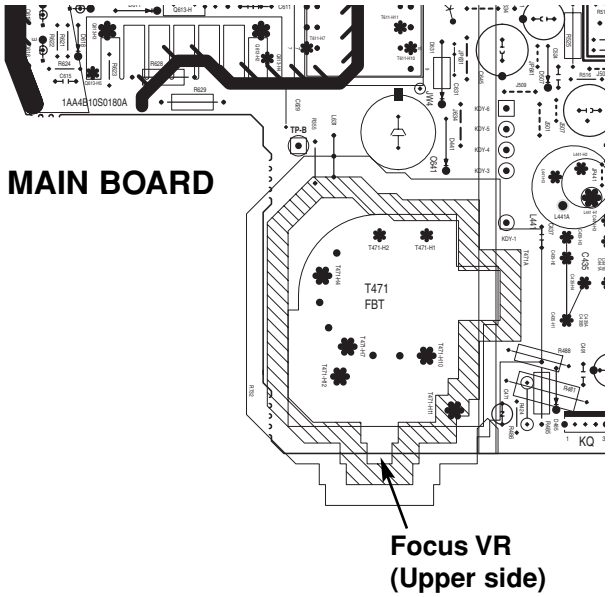
MAIN BOARD



FOCUS ADJUSTMENT

(1) Receive the monochrome circular pattern.
(2) Set the brightness to normal and contrast to maximum.
(3) Adjust the focus control on the F.B.T. for the best focus on the screen centre.

MAIN BOARD



HIGH VOLTAGE CHECK

Note: *+B (+130V) Voltage Check and Grayscale Adjustment must be completed before attempting High Voltage Check.*

(1) Connect high voltage voltmeter negative lead to ground, and connect + lead to anode of picture tube.
(2) Tune receiver to an active channel and confirm TV is operating properly.
(3) Maximize the beam current by adjusting the contrast and brightness controls to maximum. Confirm high voltage is within 24.0 KV and 26.5 KV at maximum beam current.
(4) Eliminate the beam current by adjusting the contrast and brightness controls to minimum. Confirm high voltage does not exceed 28.0 KV at zero beam current.

If reading is not within range, check horizontal circuit.

No high-voltage adjustment is provided on this chassis.

Special Function

The following special functions can be set up on this TV set.

(1) Volume Lock setting

With this function, a maximum sound volume limit can be set at any level.

(2) Tuning Lock setting

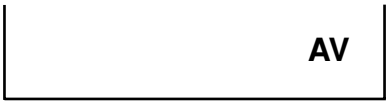
Once TUNING LOCK is switched on, further channel tuning (Pre-set) is not possible. The Channel Swapping function also is not possible.

(3) Music Mode setting

When Music Mode is ON, Programme position from “91” to “99” and “0” are set Music Mode. Only sound is provided and any picture is not on the screen under Music Mode.

(4) AV Start setting

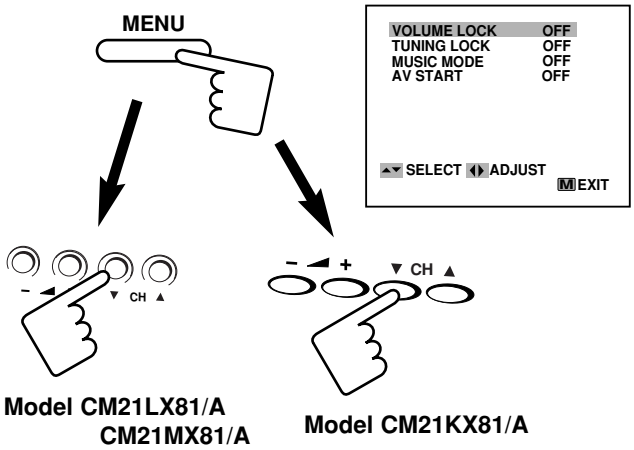
Set AV-START to ON and every time the TV set is switched on, AV position will be the initial programme position.



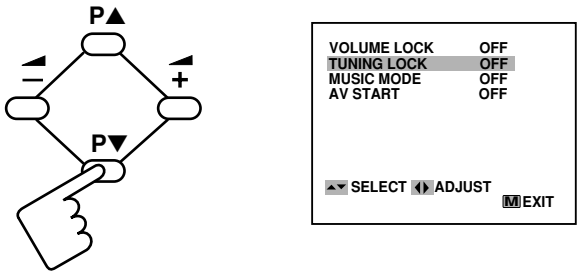
How to set the special function:

Note: When making the VOLUME LOCK setting, set the desired maximum sound volume by pressing the **VOLUME +** or **–** button before entering Special Function setting mode.

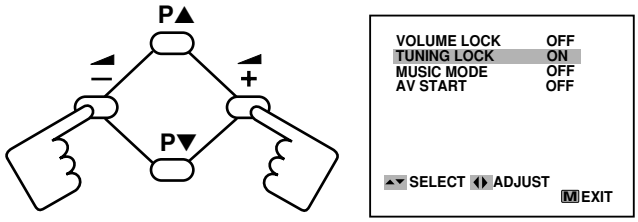
1 To enter into the special function setting mode, press and hold the **MENU** button of the remote control, then press the **PROGRAMME DOWN** button on the TV set.



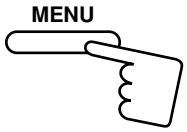
2 Select an item of the special functions by pressing the **PROGRAMME UP** or **DOWN** button on the remote control or the TV set.



3 Set the selected special function “ ON “ by pressing the **VOLUME +** or **–** button. To cancel, set to “ OFF”.



4 Press the **MENU** button of the remote control to return to the normal TV mode.



Purity and Convergence Adjustment

CAUTION: The Convergence and Purity adjustments have been made at the factory. Readjustment should be made only after picture tube or deflection yoke replacement, following the steps below:

PURITY ADJUSTMENT

1. Demagnetize the picture tube and receiver using an external degaussing coil. When replacing picture tube or deflection yoke, mount deflection yoke and purity-convergence magnets assembly properly, see figures 1 and 4.
2. Turn Red and Blue guns off and provide only Green raster. Rotate Screen control to fully counterclockwise. Rotate Red and Blue Bias controls fully counterclockwise. Slowly rotate Green Bias control clockwise to produce Green raster.
3. Loosen the screw holding the Deflection Yoke and remove the 3 Rubber Wedges, and slide the Deflection Yoke fully forward.
4. Rotate and spread the Tabs of the two Purity Magnets to centre the vertical green belt in the picture screen. The Purity Magnets are also adjusted to obtain vertical centring of the raster.
5. Slowly slide the Deflection Yoke backward until a uniform green screen is obtained.
6. Check the purity of the red and blue screens for uniformity, turn off other colours to check this (use bias controls). Readjust the yoke position if necessary until all screens are pure.
7. Adjust each Bias control and screen control to obtain white raster. Refer to Gray Scale Adjustment. If part of the picture screen is coloured, adjust the Deflection Yoke position forward or backward slightly.
8. Tighten the mounting screw of the Deflection Yoke. Adjust Convergence next.

CENTRE CONVERGENCE ADJUSTMENT

1. Use a dot crosshatch pattern signal.
2. Turn Red and Blue guns on and turn off Green gun. Adjust the angle between the Tabs of the Four Pole Magnet 1 and 2, and superimpose the Red and Blue vertical lines in the centre area of the picture screen. Refer to figure 2.
3. Keeping the mutual angle of the Tabs of the Four Pole Magnet turn them together to superimpose the Blue and Red horizontal lines in the centre area of the picture screen. Refer to figure 2.
4. Turn Green gun on and adjust Six Pole Magnet 3 and 4 that the Green line superimposed on the Red/Blue lines.
   This is the same procedure used in steps 2 and 3.
   Refer to figure 3.

OUTER AREA CONVERGENCE ADJUSTMENT

Slightly loosen the screw holding the Deflection Yoke. Adjust the Deflection Yoke to converge the detail in the outer area (left side and right side) of the picture screen by orbital movement of the front of the Yoke, then secure the Deflection Yoke in appropriate position by putting the wedges as illustrated. Tighten screw holding the Deflection Yoke.

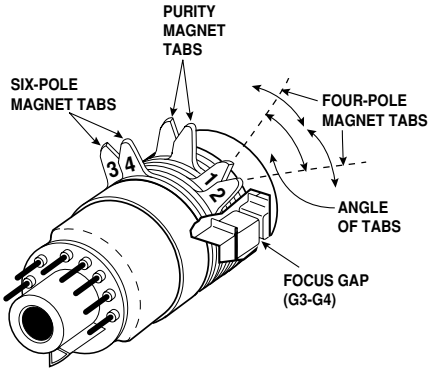


Figure 1. Purity and Convergence Magnets

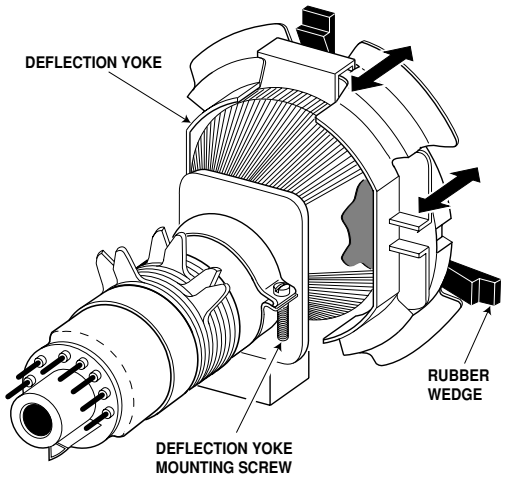


Figure 4. Deflection Yoke Movement

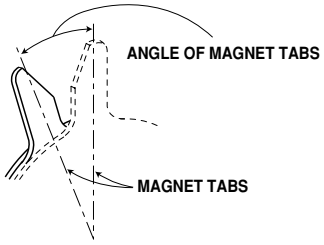


Figure 5. Adjusting Magnet

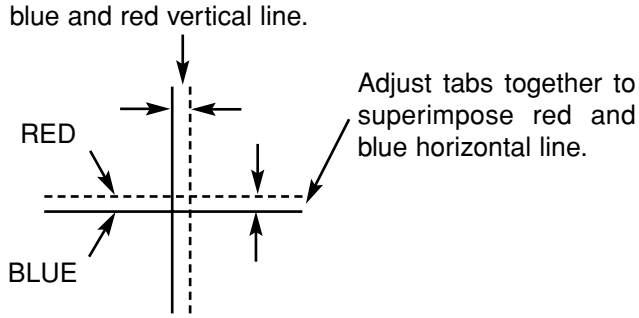


Figure- 2 BLUE AND RED LINE MOVEMENT

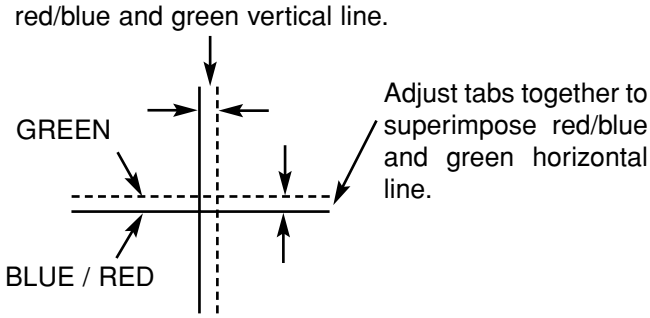
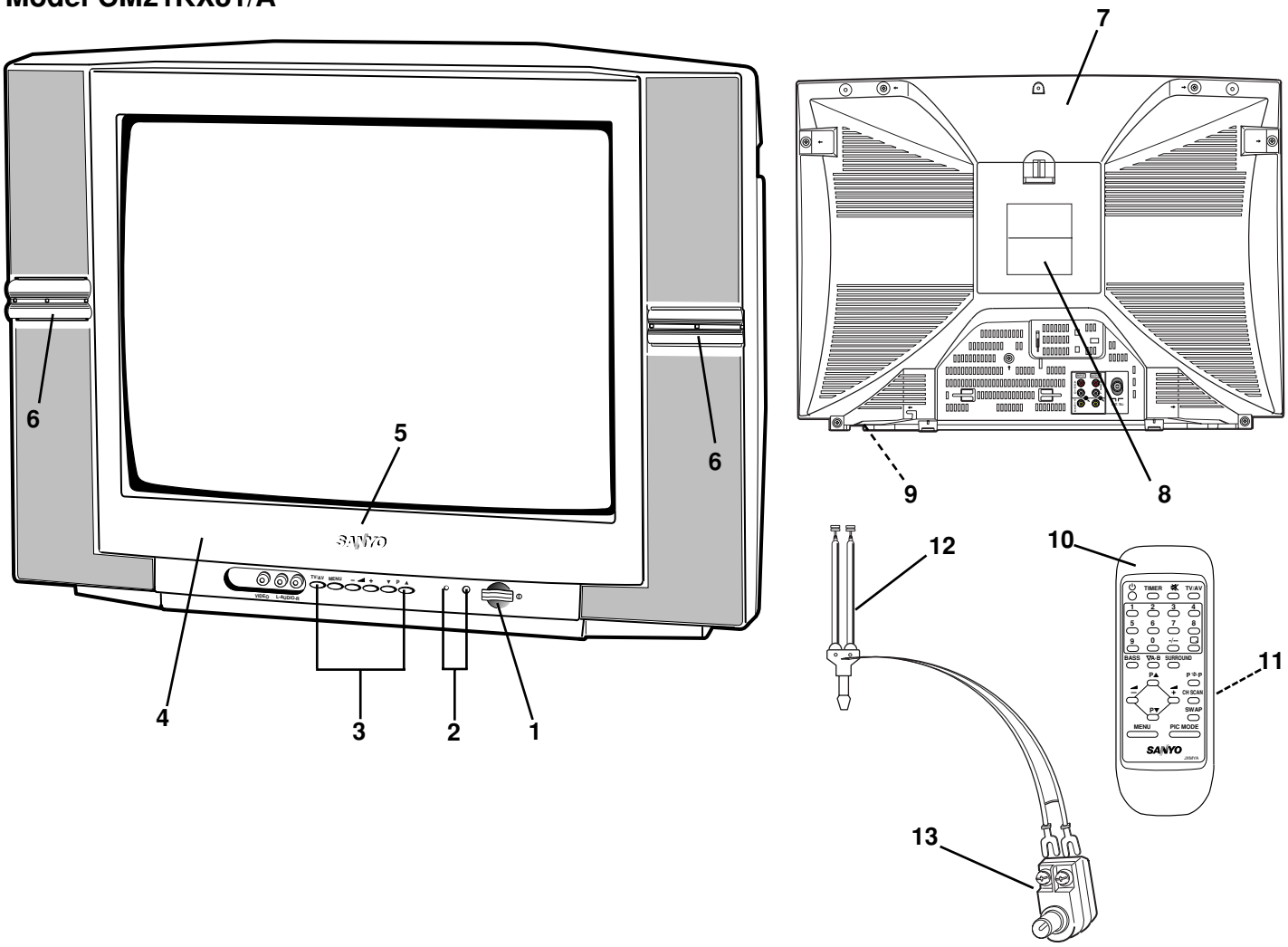


Figure- 3 BLUE/RED AND GREEN MOVEMENT

Cabinet Parts List

Note: Parts order must contain Service Ref. No., Part No., and descriptions.

Model CM21KX81/A

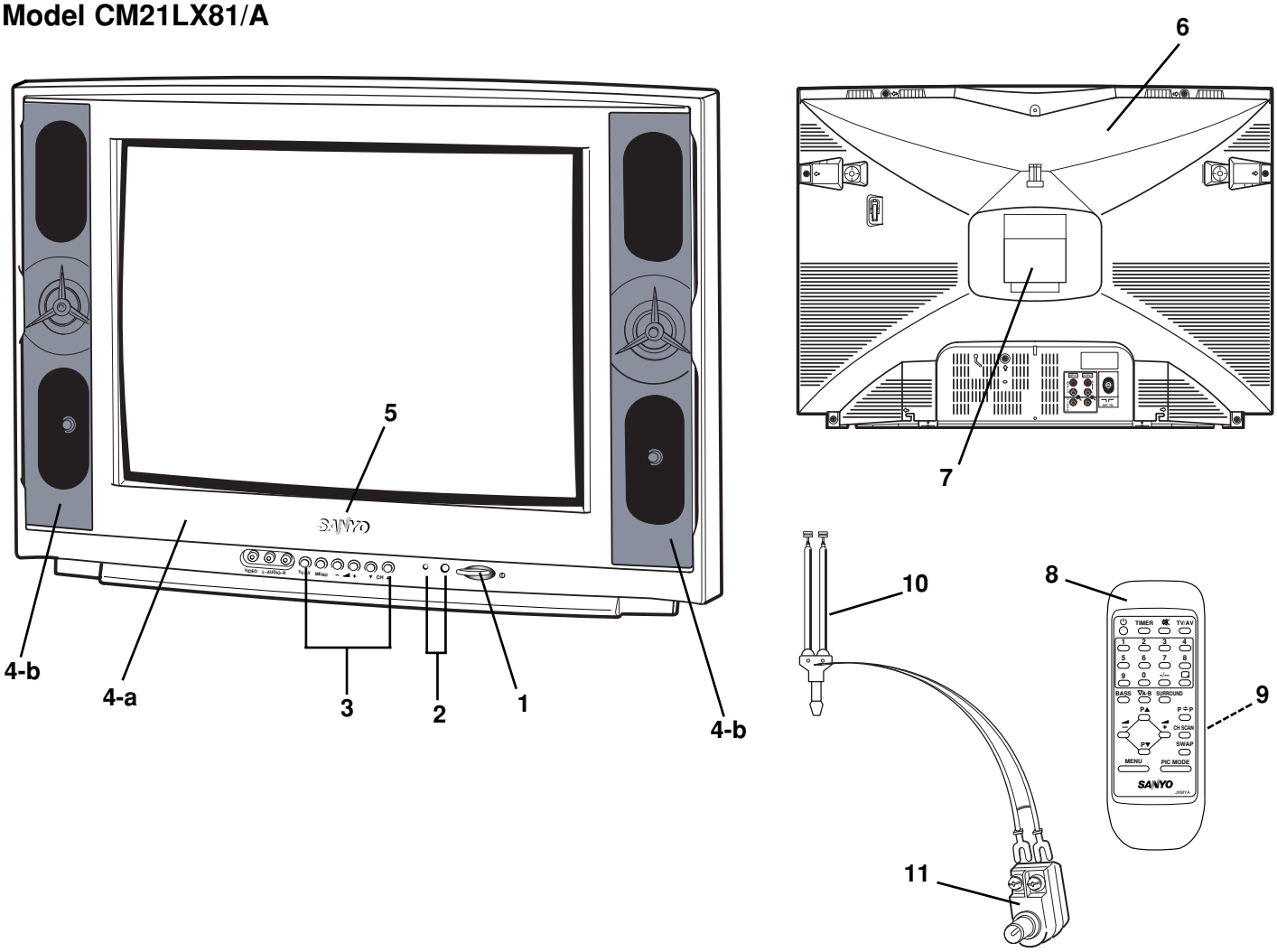


Key No.	Part No.	Description
1	610 307 2777	ASSY,BUTTON POWER-C4VKR
	610 229 8406	SPRING-E3HA
2	610 293 3741	DEC IND-C4SA
3	610 307 2784	ASSY,BUTTON UNITED-C4VKR
4	610 311 7638	CABINET FRONT-C4VW
5	645 040 4672	BADGE,SANYO*43.5X10L43.5
or	645 041 7269	BADGE,SANYO*43.5X10L43.5
6	610 307 3248	DEC.SPEAKER-C4VKR
7	610 311 0851	CABINET BACK-C4TS
8	610 311 1360	LABEL RATING-C4VW (MODEL CM21KX81)
	610 311 1377	LABEL RATING-C4VWA (MODEL CM21KX81A)
9	610 256 7670	HOLDER AC CORD-SGP-D4VA
10	645 054 3579	ASSY,REMOCON JXMYA
11	610 300 5102	RC-BATTERY LID-JXMYA
12	610 011 6405	ROD ANTENNA ASSY
or	610 216 4886	ROD ANTENNA ASSY
or	610 217 1006	ROD ANTENNA ASSY
or	645 012 0428	ROD ANTENNA ASSY
or	645 042 4519	ROD ANTENNA ASSY
13	645 003 2837	ANT MATCHING BOX
or	610 230 3216	ANT MATCHING BOX
	610 309 4816	INSTRUCTIONS MANUAL-C5JR (ENGLISH + ARABIC)
	610 309 4823	SIMPLIFIED INST_C5JR (SPANISH + RUSSIAN)

Cabinet Parts List

Note: Parts order must contain Service Ref. No., Part No., and descriptions.

Model CM21LX81/A

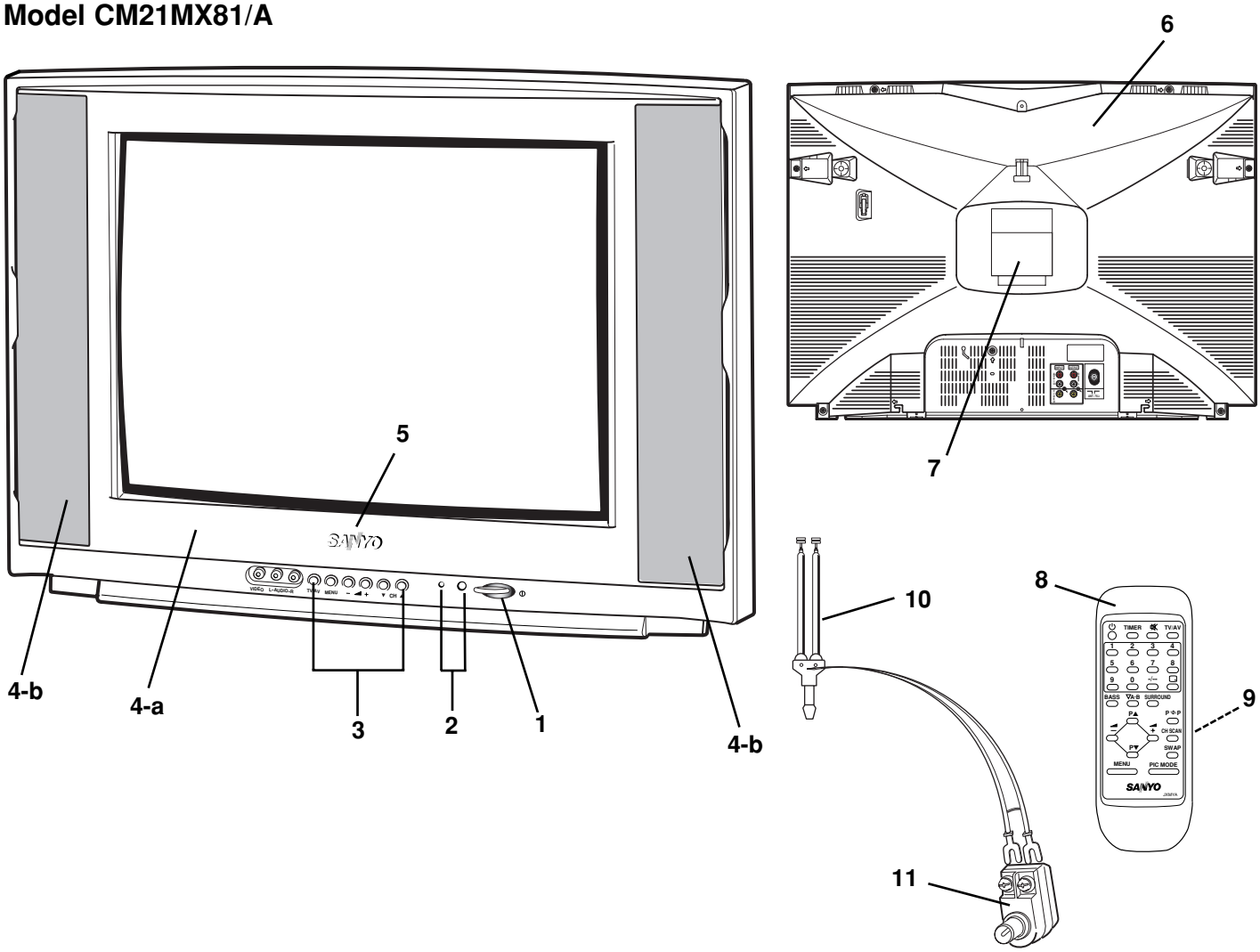


Key No.	Part No.	Description
1	610 305 7347	BUTTON POWER-C5JA
2	610 293 3741	DEC IND-C4SA
3	610 312 7996	ASSY,BUTTON UNITED-C5RA
4	610 308 9553	ASSY,CABINET FRONT-C5RA
4-a	610 305 7361	CABINET FRONT-C5RA
4-b	610 305 7477	GRILLE SPEAKER-C5RA
5	645 040 4672	BADGE,SANYO*43.5X10L43.5
or	645 041 7269	BADGE,SANYO*43.5X10L43.5
6	610 305 7385	CABINET BACK-C5RA
7	610 310 1118	LABEL RATING-C5RR (MODEL CM21LX81)
	610 310 1125	LABEL RATING-C5RRA (MODEL CM21LX81A)
8	645 054 3579	ASSY,REMOCON JXMYA
9	610 300 5102	RC-BATTERY LID-JXMYA
10	610 011 6405	ROD ANTENNA ASSY
or	610 216 4886	ROD ANTENNA ASSY
or	610 217 1006	ROD ANTENNA ASSY
or	645 012 0428	ROD ANTENNA ASSY
or	645 042 4519	ROD ANTENNA ASSY
11	645 003 2837	ANT MATCHING BOX
or	610 230 3216	ANT MATCHING BOX
	610 309 4816	INSTRUCTIONS MANUAL-C5JR (ENGLISH + ARABIC)
	610 309 4823	SIMPLIFIED INST_C5JR (SPANISH + RUSSIAN)

Cabinet Parts List

Note: Parts order must contain Service Ref. No., Part No., and descriptions.

Model CM21MX81/A



Key No.	Part No.	Description
1	610 310 8452	BUTTON POWER-C6SA
2	610 293 3741	DEC IND-C4SA
3	610 307 2760	ASSY,BUTTON UNITED-C4SKR
4	610 309 2683	ASSY,CABINET FRONT-C6YA
4-a	610 310 8476	CABINET FRONT-C6YG
4-b	610 305 7415	DEC SPEAKER-C5RA
5	645 040 4672	BADGE,SANYO*43.5X10L43.5
or	645 041 7269	BADGE,SANYO*43.5X10L43.5
6	610 305 7385	CABINET BACK-C5RA
7	610 311 4736	LABEL RATING-C6YR (MODEL CM21MX81)
	610 311 4743	LABEL RATING-C6YRA (MODEL CM21MX81A)
8	645 054 3579	ASSY,REMOCON JXMYA
9	610 300 5102	RC-BATTERY LID-JXMYA
10	610 011 6405	ROD ANTENNA ASSY
or	610 216 4886	ROD ANTENNA ASSY
or	610 217 1006	ROD ANTENNA ASSY
or	645 012 0428	ROD ANTENNA ASSY
or	645 042 4519	ROD ANTENNA ASSY

Key No.	Part No.	Description
11	645 003 2837	ANT MATCHING BOX
or	610 230 3216	ANT MATCHING BOX
	610 309 4816	INSTRUCTIONS MANUAL-C5JR (ENGLISH + ARABIC)
	610 309 4823	SIMPLIFIED INST_C5JR (SPANISH + RUSSIAN)

Chassis Electrical Parts List Model CM21KX81/A, CM21LX81/A, CM21MX81/A

Product safety should be considered when a component replacement is made in any area of a receiver. Components indicated by a ⚠ mark in this parts list and the circuit diagram show components whose value have special significance to product safety. It is particularly recommended that only parts specified on the following parts list be used for components replacement pointed out by the mark.

Note: Parts order must contain Service Ref. No., Part No., and descriptions. The main PCB unit will be supplied without tuner and flyback transformer. They should be ordered separately.

Ref. No.	Part No.	Description

NOTES:

Read description in the Capacitor and Resistor as follows:

CAPACITOR
CERAMIC 100P K 50V

Rated Voltage

Tolerance Symbols:
Less than 10pF
A : Not specified B : ±0.1pF C : ±0.25pF
D : ±0.5pF F : ±1PF G : ±2pF
R : ±0.25-0pF S : ±0-0.25pF E : +0-1pF
More than 10pF
A : Not specified B : ±0.1% C : ±0.25%
D : ±0.5% F : ±1% G : ±2%
H : ±3% J : ±5% K : ±10%
L : ±15% M : ±20% N : ±30%
P : +100-0% Q : +30-10% T : +50-10%
U : +75-10% V : +20-10% W : +100-10%
X : +40-20% Y : +150-10% Z : +80-20%

Rated value: P=pico farad, U=micro farad

Material:
CERAMIC.....Ceramic
MT-PAPER.....Metallized Paper
POLYESTER.....Polyester
MT-POLYEST.....Metallized Polyester
POLYPRO.....Polypropylene
MT-POLYPRO....Metallized Polypropylene
COMPO FILM.....Composite film
MT-COMPO.....Metallized Composite
STYRENE.....Styrene
TA-SOLID.....Tantalum Solid
AL-SOLID.....Aluminium Solid
ELECT.....Electrolytic
NP-ELECT.....Non-polarised Electrolytic
OS-SOLID.....Aluminium Solid with Organic Semiconductive Electrolytic
DL-ELECT.....Double Layered Electrolytic

RESISTOR
CARBON 4.7K J A 1/4W

Rated Wattage

Performance Symbols:
A: General B: Non flammable Z: Low noise
Other: Temperature coefficient

Tolerance Symbols:
A: ±0.05% B: ±0.1% C: ±0.25% D: ±0.5%
F: ±1% G: ±2% J: ±5% K: ±10%
M: ±20% P: +5-15%

Rated value, ohms:
K: 1,000, M: 1,000,000

Material:
CARBON.....Carbon
MT-FILM.....Metal Film
OXIDE-MT.....Oxide Metal Film
SOLID.....Composition
MT-GLAZE.....Metal Glaze
WIRE WOUND...Wire Wound
CERAMIC RES..Ceramic
FUSIBLE RES....Fusible

Ref. No.	Part No.	Description

OUT OF CIRCUIT BOARD

PICTURE TUBE

⚠Q901	414 010 5502	CRT A51QAE320X (N)

COIL

⚠L901	645 051 5514	COIL,DEGAUSSING
⚠L902	645 038 3885	YOKE,DEFLECTION

MISCELLANEOUS

SP901	645 002 4313	SPEAKER,8
	645 054 3050	SPEAKER,8
SP902	645 002 4313	SPEAKER,8
	645 054 3050	SPEAKER,8
⚠W901	645 039 9251	CORD,POWER-2.0MK-A5003
W902	610 272 4479	GROUNDING CONNECTOR F6VC
	610 281 5184	ASSY,WIRE GND CONNECTOR F

610 313 3607 ASSY,PWB,MAIN C5RR 1AA0B10S124DA

TRANSISTOR

Q111	405 015 9701	TR 2SC2814-F4-TB
Q122	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 173 9803	TR 2SC3928A1R
	405 173 9902	TR 2SC3928A1S
Q173	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 173 9803	TR 2SC3928A1R
	405 173 9902	TR 2SC3928A1S
Q1902	406 000 6804	TR 2SA1015-G(SAN)-TPE2
	405 001 7407	TR 2SA1015-O(SAN)
	405 001 7605	TR 2SA1015-Y(SAN)
	405 004 3109	TR 2SA564A-Q(CU)
	405 004 3208	TR 2SA564A-R(CU)
	405 006 1707	TR 2SA933S-Q
	405 006 1806	TR 2SA933S-R
Q261	406 000 6804	TR 2SA1015-G(SAN)-TPE2
	405 001 7407	TR 2SA1015-O(SAN)
	405 001 7605	TR 2SA1015-Y(SAN)
	405 004 3109	TR 2SA564A-Q(CU)
	405 004 3208	TR 2SA564A-R(CU)
	405 006 1707	TR 2SA933S-Q
	405 006 1806	TR 2SA933S-R
Q431	405 018 0507	TR 2SC3332-R
	405 018 0606	TR 2SC3332-S
Q432	406 017 1908	TR TT2140LS-YB11
Q611	405 013 6801	TR 2SC2274-E
	405 013 7006	TR 2SC2274-F
Q612	405 013 6801	TR 2SC2274-E
	405 013 7006	TR 2SC2274-F

Ref. No.	Part No.	Description
Q613	405 181 4609	TR 2SK3264
Q614	405 006 6504	TR 2SA984-E
	405 006 6702	TR 2SA984-F
Q615	406 000 6804	TR 2SA1015-G(SAN)-TPE2
	405 001 7407	TR 2SA1015-O(SAN)
	405 001 7605	TR 2SA1015-Y(SAN)
	405 004 3109	TR 2SA564A-Q(CU)
	405 004 3208	TR 2SA564A-R(CU)
	405 006 1707	TR 2SA933S-Q
	405 006 1806	TR 2SA933S-R
Q616	405 011 8401	TR 2SC1740S-Q
	405 011 8500	TR 2SC1740S-R
	405 011 8609	TR 2SC1740S-S
	405 012 2002	TR 2SC1815-GR
	405 012 2101	TR 2SC1815-O
	405 012 2309	TR 2SC1815-Y
	405 020 7501	TR 2SC945A-PA
	405 020 7709	TR 2SC945A-QA
	405 020 7907	TR 2SC945A-RA
Q631	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 173 9803	TR 2SC3928A1R
	405 173 9902	TR 2SC3928A1S
Q635	405 011 8401	TR 2SC1740S-Q
	405 011 8500	TR 2SC1740S-R
	405 011 8609	TR 2SC1740S-S
	405 012 2002	TR 2SC1815-GR
	405 012 2101	TR 2SC1815-O
	405 012 2309	TR 2SC1815-Y
	405 020 7501	TR 2SC945A-PA
	405 020 7709	TR 2SC945A-QA
	405 020 7907	TR 2SC945A-RA
Q661	405 059 9903	TR 2SD1913-R-RA
	405 060 0005	TR 2SD1913-S-RA
Q666	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 173 9803	TR 2SC3928A1R
	405 173 9902	TR 2SC3928A1S
Q681	405 011 8401	TR 2SC1740S-Q
	405 011 8500	TR 2SC1740S-R
	405 011 8609	TR 2SC1740S-S
	405 012 2002	TR 2SC1815-GR
	405 012 2101	TR 2SC1815-O
	405 012 2309	TR 2SC1815-Y
	405 020 7501	TR 2SC945A-PA
	405 020 7709	TR 2SC945A-QA
	405 020 7907	TR 2SC945A-RA
Q683	405 089 0000	TR 2SA1707-S
	405 089 0109	TR 2SA1707-T
	405 009 6907	TR 2SB985-S
	405 009 7003	TR 2SB985-T
Q684	405 011 8401	TR 2SC1740S-Q
	405 011 8500	TR 2SC1740S-R
	405 011 8609	TR 2SC1740S-S
	405 012 2002	TR 2SC1815-GR
	405 012 2101	TR 2SC1815-O
	405 012 2309	TR 2SC1815-Y
	405 020 7501	TR 2SC945A-PA
	405 020 7709	TR 2SC945A-QA
	405 020 7907	TR 2SC945A-RA
Q685	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 173 9803	TR 2SC3928A1R
	405 173 9902	TR 2SC3928A1S
Q686	406 000 6804	TR 2SA1015-G(SAN)-TPE2
	405 001 7407	TR 2SA1015-O(SAN)
	405 001 7605	TR 2SA1015-Y(SAN)
	405 004 3109	TR 2SA564A-Q(CU)
	405 004 3208	TR 2SA564A-R(CU)
	405 006 1707	TR 2SA933S-Q
	405 006 1806	TR 2SA933S-R
Q861	405 134 5905	TR 2SA1037AK-T146-R
	405 147 2205	TR 2SA1037AK-S-T146
	405 002 0308	TR 2SA1037K T146 R
	405 002 0407	TR 2SA1037K T146 S
	405 002 6706	TR 2SA1179-M6-TB
	405 002 6904	TR 2SA1179-M7-TB
	405 173 9605	TR 2SA1235A1E
	405 173 9704	TR 2SA1235A1F
Q871	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 173 9803	TR 2SC3928A1R
	405 173 9902	TR 2SC3928A1S
Q881	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 173 9803	TR 2SC3928A1R
	405 173 9902	TR 2SC3928A1S
Q886	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 173 9803	TR 2SC3928A1R
	405 173 9902	TR 2SC3928A1S
INTEGRATED CIRCUIT		
IC001	409 575 2202	IC AN17820B
IC201	409 517 5902	IC LA76818A
IC202	409 241 5407	IC BA178M05T
	409 265 4806	IC L78M05CV
	409 172 1509	IC MC78M05CT
	409 320 5700	IC UPC78M05AHF
IC281	409 564 6105	IC LA7642NM-TLM-E
IC3701	409 564 4309	IC NJW1142M
IC501	409 449 4103	IC LA78040
	409 507 0900	IC LA78040N
IC651	409 241 5407	IC BA178M05T
	409 265 4806	IC L78M05CV
	409 172 1509	IC MC78M05CT
	409 320 5700	IC UPC78M05AHF
IC801	410 486 2007	IC LC863448W-XXXX-TLM
IC802	410 495 8007	IC AT24C16A-10PI-2.7
	409 459 4506	IC 24LC16B/P
CAPACITOR		
C001	404 088 6600	ELECT 2200U M 25V
	403 045 9807	ELECT 2200U M 25V
C011	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C021	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C031	404 084 8905	ELECT 10U M 50V
	403 049 4204	ELECT 10U M 50V
C1001	404 084 8905	ELECT 10U M 50V
	403 049 4204	ELECT 10U M 50V

Ref. No.	Part No.	Description
C1002	404 084 8905	ELECT 10U M 50V
	403 049 4204	ELECT 10U M 50V
C1007	404 087 1606	ELECT 0.1U M 50V
	403 047 8402	ELECT 0.1U M 50V
C101	404 084 8301	ELECT 470U M 16V
	403 044 1703	ELECT 470U M 16V
C1010	404 084 8905	ELECT 10U M 50V
	403 049 4204	ELECT 10U M 50V
C1011	404 084 8004	ELECT 220U M 16V
	403 043 0202	ELECT 220U M 16V
C1017	404 087 1606	ELECT 0.1U M 50V
	403 047 8402	ELECT 0.1U M 50V
C106	404 084 9308	ELECT 47U M 50V
	403 051 3103	ELECT 47U M 50V
C107	404 084 9308	ELECT 47U M 50V
	403 051 3103	ELECT 47U M 50V
C111	403 215 2201	CERAMIC 0.01U K 50V
C112	403 215 2201	CERAMIC 0.01U K 50V
C113	403 215 2201	CERAMIC 0.01U K 50V
C120	403 284 4304	CERAMIC 0.022U K 50V
C121	403 215 2201	CERAMIC 0.01U K 50V
C122	404 084 7809	ELECT 100U M 16V
	403 042 2405	ELECT 100U M 16V
C123	401 105 7909	MT-GLAZE 0.000 ZA 1/16W
C132	404 084 8707	ELECT 0.47U M 50V
	403 048 6308	ELECT 0.47U M 50V
C135	404 084 8707	ELECT 0.47U M 50V
	403 048 6308	ELECT 0.47U M 50V
C138	403 284 4304	CERAMIC 0.022U K 50V
C171	403 155 2101	CERAMIC 1500P K 50V
C172	403 215 2201	CERAMIC 0.01U K 50V
C174	403 157 1904	CERAMIC 10P D 50V
C178	404 087 1606	ELECT 0.1U M 50V
	403 047 8402	ELECT 0.1U M 50V
C1902	404 087 5406	ELECT 22U M 50V
	403 050 2800	ELECT 22U M 50V
C201	404 084 9803	NP-ELECT 1U M 50V
	403 086 2300	NP-ELECT 1U M 50V
C202	403 058 2604	POLYESTER 0.015U J 50V
	403 179 3207	POLYESTER 0.015U J 50V
C203	403 215 2201	CERAMIC 0.01U K 50V
C204	404 084 8905	ELECT 10U M 50V
	403 049 4204	ELECT 10U M 50V
C205	404 084 8905	ELECT 10U M 50V
	403 049 4204	ELECT 10U M 50V
C206	403 342 3300	CERAMIC 0.1U K 25V
C207	403 342 3300	CERAMIC 0.1U K 25V
C209	404 084 8707	ELECT 0.47U M 50V
	403 048 6308	ELECT 0.47U M 50V
C210	404 084 8400	ELECT 1000U M 25V
	403 045 1504	ELECT 1000U M 25V
C212	403 155 4204	CERAMIC 15P J 50V
C218	401 105 7909	MT-GLAZE 0.000 ZA 1/16W
C219	403 215 2201	CERAMIC 0.01U K 50V
C221	403 342 3300	CERAMIC 0.1U K 25V
C222	403 342 3300	CERAMIC 0.1U K 25V
C223	403 342 3300	CERAMIC 0.1U K 25V
C224	403 342 3300	CERAMIC 0.1U K 25V
C225	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C226	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C230	403 215 2201	CERAMIC 0.01U K 50V
C231	403 260 2904	MT-COMPO 0.33U J 50V
C232	403 260 2904	MT-COMPO 0.33U J 50V
C233	404 084 8400	ELECT 1000U M 25V
	403 045 1504	ELECT 1000U M 25V

Ref. No.	Part No.	Description
C234	403 215 2201	CERAMIC 0.01U K 50V
C243	403 215 2201	CERAMIC 0.01U K 50V
C244	404 084 9308	ELECT 47U M 50V
	403 051 3103	ELECT 47U M 50V
C245	404 084 9803	NP-ELECT 1U M 50V
	403 086 2300	NP-ELECT 1U M 50V
C246	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C247	404 084 9001	ELECT 2.2U M 50V
	403 049 9803	ELECT 2.2U M 50V
C273	403 342 3300	CERAMIC 0.1U K 25V
C278	403 342 3300	CERAMIC 0.1U K 25V
C280	403 215 2201	CERAMIC 0.01U K 50V
C281	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C282	403 215 2201	CERAMIC 0.01U K 50V
C283	403 215 2201	CERAMIC 0.01U K 50V
C284	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C285	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C286	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C287	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C288	403 179 1708	POLYESTER 0.033U J 50V
C289	404 084 8905	ELECT 10U M 50V
	403 049 4204	ELECT 10U M 50V
C291	403 181 8207	POLYESTER 0.1U K 50V
C358	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C3701	404 084 8301	ELECT 470U M 16V
	403 044 1703	ELECT 470U M 16V
C3702	403 342 3300	CERAMIC 0.1U K 25V
C3710	404 084 9209	ELECT 4.7U M 50V
	403 051 0607	ELECT 4.7U M 50V
C3711	404 084 9209	ELECT 4.7U M 50V
	403 051 0607	ELECT 4.7U M 50V
C3712	404 084 9209	ELECT 4.7U M 50V
	403 051 0607	ELECT 4.7U M 50V
C3713	404 084 9209	ELECT 4.7U M 50V
	403 051 0607	ELECT 4.7U M 50V
C3714	403 113 4109	CERAMIC 2200P K 50V
C3715	403 342 3300	CERAMIC 0.1U K 25V
C3717	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C3720	404 084 9209	ELECT 4.7U M 50V
	403 051 0607	ELECT 4.7U M 50V
C3721	404 084 9209	ELECT 4.7U M 50V
	403 051 0607	ELECT 4.7U M 50V
C3722	404 084 9209	ELECT 4.7U M 50V
	403 051 0607	ELECT 4.7U M 50V
C3723	404 084 9209	ELECT 4.7U M 50V
	403 051 0607	ELECT 4.7U M 50V
C3724	403 113 4109	CERAMIC 2200P K 50V
C3725	403 342 3300	CERAMIC 0.1U K 25V
C3727	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C3730	403 284 4304	CERAMIC 0.022U K 50V
C3731	403 278 9605	CERAMIC 1U Z 16V
C3732	403 279 4302	CERAMIC 0.33U K 16V
C3733	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C3734	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C3735	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V

Ref. No.	Part No.	Description
C432	403 075 7101	CERAMIC 1000P K 500V
C433	403 076 3102	CERAMIC 3900P K 500V
C434	404 087 6007	ELECT 47U M 35V
	403 054 0703	ELECT 47U M 35V
C435	404 077 3108	MT-POLYPRO 7500P H 1.5K
	403 343 8007	MT-POLYPRO 7500P H 1.5K
C436	403 324 2307	CERAMIC 270P K 3K
	CK3Q271KCRDJ	CERAMIC 270P K 3K
C441	403 079 0108	MT-POLYPRO 0.39U J 200V
	403 346 7403	MT-POLYPRO 0.39U J 250V
C469	404 084 8905	ELECT 10U M 50V
	403 049 4204	ELECT 10U M 50V
C471	404 056 5307	NP-ELECT 2.2U M 100V
	404 084 9902	NP-ELECT 2.2U M 100V
C486	404 087 6106	ELECT 22U M 100V
	403 115 0802	ELECT 22U M 100V
C491	403 076 5304	CERAMIC 680P K 500V
C510	404 087 5406	ELECT 22U M 50V
	403 050 2800	ELECT 22U M 50V
C514	404 084 9209	ELECT 4.7U M 50V
	403 051 0607	ELECT 4.7U M 50V
C515	404 084 8400	ELECT 1000U M 25V
	403 045 1504	ELECT 1000U M 25V
C517	404 084 9407	ELECT 220U M 35V
	403 053 2104	ELECT 220U M 35V
C518	403 072 9405	CERAMIC 3300P K 50V
C521	404 084 9506	ELECT 470U M 35V
	403 054 1502	ELECT 470U M 35V
C524	403 064 1202	POLYESTER 0.1U K 100V
	403 276 9706	POLYESTER 0.1U K 100V
⚠C601	404 060 7205	MT-POLYEST 0.1U M 250V
	404 093 6107	MT-POLYEST 0.1U M 275V
⚠C602	404 060 7205	MT-POLYEST 0.1U M 250V
	404 093 6107	MT-POLYEST 0.1U M 275V
C607	404 072 8405	ELECT 270U M 400V
	404 078 7600	ELECT 270U M 400V
C608	403 247 1609	CERAMIC 220P K 1K
	403 325 5109	CERAMIC 220P K 1K
C610	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C611	403 247 5003	CERAMIC 470P K 1K
C612	403 237 8007	MT-COMPO 0.1U J 50V
	403 243 6806	MT-COMPO 0.1U J 50V
C613	403 178 9408	POLYESTER 0.012U J 50V
	403 249 8903	MT-COMPO 0.012U J 50V
C614	403 056 9704	POLYESTER 0.01U J 50V
	403 178 9309	POLYESTER 0.01U J 50V
C615	404 084 9100	ELECT 3.3U M 50V
	403 050 6600	ELECT 3.3U M 50V
⚠C627	404 073 3904	CERAMIC 1000P K 250V
	404 073 2105	CERAMIC 1000P M 250V
⚠C628	404 073 4505	CERAMIC 2200P K 250V
	404 073 2907	CERAMIC 2200P M 250V
C631	403 247 5003	CERAMIC 470P K 1K
	403 269 1809	CERAMIC 470P K 1K
C632	403 247 5003	CERAMIC 470P K 1K
	403 269 1809	CERAMIC 470P K 1K
C633	403 247 5003	CERAMIC 470P K 1K
	403 269 1809	CERAMIC 470P K 1K
C634	403 247 5003	CERAMIC 470P K 1K
	403 269 1809	CERAMIC 470P K 1K
C635	404 084 8202	ELECT 47U M 16V
	403 043 9106	ELECT 47U M 16V
C641	404 073 9005	ELECT 220U M 160V
C643	404 084 9506	ELECT 470U M 35V
	403 054 1502	ELECT 470U M 35V
C644	404 084 8400	ELECT 1000U M 25V
	403 045 1504	ELECT 1000U M 25V
C645	404 088 6600	ELECT 2200U M 25V
	403 045 9807	ELECT 2200U M 25V
C646	404 087 6007	ELECT 47U M 35V
	403 054 0703	ELECT 47U M 35V
C647	403 303 6104	ELECT 2.2U M 50V
C651	404 084 7601	ELECT 470U M 10V
	403 041 4509	ELECT 470U M 10V
C661	404 084 8004	ELECT 220U M 16V
	403 043 0202	ELECT 220U M 16V
C662	404 084 8004	ELECT 220U M 16V
	403 043 0202	ELECT 220U M 16V
C685	403 049 0008	ELECT 1U M 50V
C801	403 155 4204	CERAMIC 15P J 50V
C802	403 157 2505	CERAMIC 27P J 50V
C803	403 215 2201	CERAMIC 0.01U K 50V
C805	404 084 8905	ELECT 10U M 50V
	403 049 4204	ELECT 10U M 50V
C823	403 342 3300	CERAMIC 0.1U K 25V
C824	403 342 3300	CERAMIC 0.1U K 25V
C825	403 157 3601	CERAMIC 100P J 50V
C829	403 342 3300	CERAMIC 0.1U K 25V
C835	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C851	403 157 3106	CERAMIC 56P J 50V
C852	403 157 3106	CERAMIC 56P J 50V
C853	403 157 3106	CERAMIC 56P J 50V
C861	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C862	403 342 3300	CERAMIC 0.1U K 25V
C880	403 155 2200	CERAMIC 3300P K 50V
C891	404 084 8806	ELECT 1U M 50V
	403 049 0008	ELECT 1U M 50V
C892	403 342 3300	CERAMIC 0.1U K 25V
C893	404 084 9001	ELECT 2.2U M 50V
	403 049 9803	ELECT 2.2U M 50V
C894	403 281 5007	CERAMIC 0.033U K 25V
C895	404 084 8905	ELECT 10U M 50V
	403 049 4204	ELECT 10U M 50V
RESISTOR		
R015	401 105 7909	MT-GLAZE 0.000 ZA 1/16W
R025	401 105 7909	MT-GLAZE 0.000 ZA 1/16W
R032	401 105 8203	MT-GLAZE 68K JA 1/16W
R1001	401 027 6608	CARBON 75 JA 1/6W
R1003	401 105 6506	MT-GLAZE 680 JA 1/16W
R1004	401 105 0702	MT-GLAZE 100K JA 1/16W
R1008	401 105 2102	MT-GLAZE 18K JA 1/16W
R1010	401 105 0504	MT-GLAZE 1K JA 1/16W
R1018	401 105 2102	MT-GLAZE 18K JA 1/16W
R1020	401 105 0504	MT-GLAZE 1K JA 1/16W
R1021	401 105 6506	MT-GLAZE 680 JA 1/16W
R1022	401 105 0702	MT-GLAZE 100K JA 1/16W
R1023	401 027 6608	CARBON 75 JA 1/6W
R1024	401 024 7707	CARBON 100K JA 1/6W
R103	401 061 8101	OXIDE-MT 39K JA 1W
R106	401 024 6700	CARBON 100 JA 1/6W
R107	401 024 6700	CARBON 100 JA 1/6W
R108	401 105 2102	MT-GLAZE 18K JA 1/16W
R109	401 105 8203	MT-GLAZE 68K JA 1/16W
R111	401 105 0504	MT-GLAZE 1K JA 1/16W
R112	401 105 6001	MT-GLAZE 5.6K JA 1/16W
R114	401 105 4007	MT-GLAZE 330 JA 1/16W
R115	401 027 2105	CARBON 56 JA 1/6W
R116	401 105 5806	MT-GLAZE 56 JA 1/16W
R121	401 105 6605	MT-GLAZE 6.8K JA 1/16W
R122	401 105 2805	MT-GLAZE 2.2K JA 1/16W

Ref. No.	Part No.	Description
R124	401 105 0603	MT-GLAZE 10K JA 1/16W
R125	401 105 3406	MT-GLAZE 27K JA 1/16W
R130	401 105 7909	MT-GLAZE 0.000 ZA 1/16W
R132	401 105 5202	MT-GLAZE 470 JA 1/16W
R140	401 105 5905	MT-GLAZE 560 JA 1/16W
R141	401 105 5905	MT-GLAZE 560 JA 1/16W
R173	401 105 2904	MT-GLAZE 22K JA 1/16W
R176	401 105 0603	MT-GLAZE 10K JA 1/16W
R1902	401 105 1105	MT-GLAZE 12K JA 1/16W
R1903	401 105 6001	MT-GLAZE 5.6K JA 1/16W
R1904	401 105 4601	MT-GLAZE 3.9K JA 1/16W
R1905	401 105 2805	MT-GLAZE 2.2K JA 1/16W
R1906	401 105 2003	MT-GLAZE 1.8K JA 1/16W
R1907	401 024 6700	CARBON 100 JA 1/6W
R1911	401 105 2706	MT-GLAZE 220 JA 1/16W
R1912	401 105 2706	MT-GLAZE 220 JA 1/16W
R1913	401 105 2706	MT-GLAZE 220 JA 1/16W
R209	401 113 9506	MT-GLAZE 620K JA 1/16W
R210	401 105 3703	MT-GLAZE 3K JA 1/16W
R211	401 025 1308	CARBON 150 JA 1/6W
R212	401 025 1308	CARBON 150 JA 1/6W
R221	401 105 0504	MT-GLAZE 1K JA 1/16W
R222	401 105 0504	MT-GLAZE 1K JA 1/16W
R223	401 105 0504	MT-GLAZE 1K JA 1/16W
R224	401 105 5301	MT-GLAZE 4.7K JA 1/16W
R225	401 105 5301	MT-GLAZE 4.7K JA 1/16W
R226	401 105 3406	MT-GLAZE 27K JA 1/16W
R227	401 105 4205	MT-GLAZE 33K JA 1/16W
R228	401 024 7707	CARBON 100K JA 1/6W
R229	401 105 6704	MT-GLAZE 680K JA 1/16W
R230	401 026 9303	CARBON 47 JA 1/6W
R234	401 105 0900	MT-GLAZE 120 JA 1/16W
R235	401 105 0900	MT-GLAZE 120 JA 1/16W
R236	401 105 0900	MT-GLAZE 120 JA 1/16W
R243	401 068 3703	OXIDE-MT 470 JA 2W
R244	401 105 5400	MT-GLAZE 47K JA 1/16W
R245	401 105 5400	MT-GLAZE 47K JA 1/16W
R263	401 105 0603	MT-GLAZE 10K JA 1/16W
R264	401 026 0607	CARBON 270 JA 1/6W
R265	401 105 3901	MT-GLAZE 33 JA 1/16W
R267	401 026 0607	CARBON 270 JA 1/6W
R271	401 105 0405	MT-GLAZE 100 JA 1/16W
R272	401 105 0405	MT-GLAZE 100 JA 1/16W
R280	401 024 6700	CARBON 100 JA 1/6W
R281	401 105 3406	MT-GLAZE 27K JA 1/16W
R282	401 026 4308	CARBON 3.3K JA 1/6W
R283	401 105 5301	MT-GLAZE 4.7K JA 1/16W
R284	401 105 4106	MT-GLAZE 3.3K JA 1/16W
R285	401 026 3707	CARBON 33 JA 1/6W
R286	401 203 9904	MT-GLAZE 4.7K FA 1/16W
R287	401 105 7909	MT-GLAZE 0.000 ZA 1/16W
R291	401 068 1600	OXIDE-MT 4.7 JA 2W
R340	401 105 7503	MT-GLAZE 82K JA 1/16W
R351	401 105 7404	MT-GLAZE 8.2K JA 1/16W
R352	401 012 7009	CARBON 10K JA 1/4W
R354	401 025 8208	CARBON 22K JA 1/6W
R355	401 015 3800	CARBON 18K JA 1/4W
R356	401 105 0603	MT-GLAZE 10K JA 1/16W
R357	401 026 7002	CARBON 3.9K JA 1/6W
R358	401 105 7909	MT-GLAZE 0.000 ZA 1/16W
R3701	401 105 4205	MT-GLAZE 33K JA 1/16W
R3702	401 105 4601	MT-GLAZE 3.9K JA 1/16W
R3725	401 105 4205	MT-GLAZE 33K JA 1/16W
R3726	401 105 4601	MT-GLAZE 3.9K JA 1/16W
R3731	401 105 0405	MT-GLAZE 100 JA 1/16W
R3732	401 105 0405	MT-GLAZE 100 JA 1/16W
R422	401 020 2904	CARBON 47K JA 1/4W
R423	401 022 4104	CARBON 68K JA 1/4W
R424	401 024 7004	CARBON 1K JA 1/6W
R426	401 024 7400	CARBON 10K JA 1/6W
R432	401 024 7004	CARBON 1K JA 1/6W
R433	401 007 1104	CARBON 1K JA 1/2W
R434	401 061 2505	OXIDE-MT 330 JA 1W
R441	401 064 8702	OXIDE-MT 1K JA 2W
R445	401 068 7800	OXIDE-MT 560 JA 2W
R475	401 009 5803	CARBON 330 JA 1/2W
R479	401 025 7805	CARBON 2.2K JA 1/6W
R481	401 064 5701	OXIDE-MT 1.8 JA 2W
R488	402 022 2008	FUSIBLE RES 1.0 J- 1/2W
R501A	401 064 8702	OXIDE-MT 1K JA 2W
R510	401 027 5908	CARBON 68K JA 1/6W
R511	401 026 4605	CARBON 33K JA 1/6W
R514	401 024 9701	CARBON 12K JA 1/6W
R515	401 025 4606	CARBON 18K JA 1/6W
R516	401 024 7400	CARBON 10K JA 1/6W
R518	401 006 8807	CARBON 1.8 JA 1/2W
R522	401 025 7409	CARBON 220 JA 1/6W
R525	401 059 6706	OXIDE-MT 180 JA 1W
R602	402 082 5605	WIRE WOUND 1.8 KA 10W
	402 080 2002	WIRE WOUND 1.8 KA 7W
R603	401 010 9203	CARBON 560K JA 1/2W
R604	401 066 9103	OXIDE-MT 27 JA 2W
R605	401 010 9203	CARBON 560K JA 1/2W
R606	401 027 0507	CARBON 470K JA 1/6W
R607	401 019 9600	CARBON 47 JA 1/4W
R609	401 025 8208	CARBON 22K JA 1/6W
R611	401 027 0309	CARBON 47K JA 1/6W
R612	402 001 8502	FUSIBLE RES 10 J- 1/2W
R613	401 228 0405	OXIDE-MT 0.27 JA 2W
R615	401 016 1508	CARBON 22 JA 1/4W
R616	401 024 7400	CARBON 10K JA 1/6W
R617	402 001 8601	FUSIBLE RES 1K J- 1/2W
R618	401 024 7004	CARBON 1K JA 1/6W
R619	401 025 8208	CARBON 22K JA 1/6W
R620	401 020 0801	CARBON 470 JA 1/4W
R621	401 024 7400	CARBON 10K JA 1/6W
R622	401 027 0309	CARBON 47K JA 1/6W
R623	401 025 4606	CARBON 18K JA 1/6W
R624	401 025 8208	CARBON 22K JA 1/6W
⚠R628	402 000 8305	SOLID 5.6M KA 1/2W
⚠R629	402 000 8305	SOLID 5.6M KA 1/2W
R631	401 022 3107	CARBON 6.8K JA 1/4W
R632	401 105 0504	MT-GLAZE 1K JA 1/16W
R634	401 105 5400	MT-GLAZE 47K JA 1/16W
R635	401 007 2309	CARBON 100K JA 1/2W
R636	401 105 5301	MT-GLAZE 4.7K JA 1/16W
R637TM	401 007 9308	CARBON 150K JA 1/2W
R638TM	401 060 9307	OXIDE-MT 27K JA 1W
R639	401 013 6407	CARBON 12K JA 1/4W
R643	402 051 8705	FUSIBLE RES 4.7 J- 1/2W
R645	407 005 4505	DIODE DS442X
	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
R661	401 060 7402	OXIDE-MT 270 JA 1W
R663	401 013 6407	CARBON 12K JA 1/4W
R664	401 067 3100	OXIDE-MT 3.9 JA 2W
R666	401 105 2904	MT-GLAZE 22K JA 1/16W
R667	401 105 1105	MT-GLAZE 12K JA 1/16W
R668	401 105 5400	MT-GLAZE 47K JA 1/16W
R669	401 027 2600	CARBON 5.6K JA 1/6W
R670	401 105 5400	MT-GLAZE 47K JA 1/16W
R681	401 024 7004	CARBON 1K JA 1/6W

Ref. No.	Part No.	Description
R682	401 025 8208	CARBON 22K JA 1/6W
R683	401 105 6100	MT-GLAZE 560K JA 1/16W
R684	401 105 0603	MT-GLAZE 10K JA 1/16W
R685	401 105 2904	MT-GLAZE 22K JA 1/16W
R686	401 012 7009	CARBON 10K JA 1/4W
R687	401 019 1901	CARBON 3.9K JA 1/4W
R688	401 025 8208	CARBON 22K JA 1/6W
R689	401 027 3201	CARBON 560K JA 1/6W
R801	401 105 3505	MT-GLAZE 270K JA 1/16W
R804	401 105 7909	MT-GLAZE 0.000 ZA 1/16W
R805	401 105 7909	MT-GLAZE 0.000 ZA 1/16W
R811	401 105 0603	MT-GLAZE 10K JA 1/16W
R813	401 105 0603	MT-GLAZE 10K JA 1/16W
R814	401 105 0603	MT-GLAZE 10K JA 1/16W
R815	401 105 0603	MT-GLAZE 10K JA 1/16W
R817	401 105 0504	MT-GLAZE 1K JA 1/16W
R818	401 024 7004	CARBON 1K JA 1/6W
R819	401 105 0603	MT-GLAZE 10K JA 1/16W
R830	401 105 0504	MT-GLAZE 1K JA 1/16W
R831	401 105 5202	MT-GLAZE 470 JA 1/16W
R832	403 157 3601	CERAMIC 100P J 50V
R834	401 105 0603	MT-GLAZE 10K JA 1/16W
R835	401 105 0603	MT-GLAZE 10K JA 1/16W
R836	401 105 0603	MT-GLAZE 10K JA 1/16W
R837	401 105 1600	MT-GLAZE 15K JA 1/16W
R838	401 105 1600	MT-GLAZE 15K JA 1/16W
R839	401 105 4007	MT-GLAZE 330 JA 1/16W
R840	401 105 4007	MT-GLAZE 330 JA 1/16W
R841	401 105 5301	MT-GLAZE 4.7K JA 1/16W
R842	401 105 5301	MT-GLAZE 4.7K JA 1/16W
R851	401 025 1605	CARBON 1.5K JA 1/6W
R853	401 027 8602	CARBON 8.2K JA 1/6W
R855	401 027 8602	CARBON 8.2K JA 1/6W
R857	401 027 8602	CARBON 8.2K JA 1/6W
R861	401 105 1501	MT-GLAZE 1.5K JA 1/16W
R862	401 105 7404	MT-GLAZE 8.2K JA 1/16W
R863	401 105 5400	MT-GLAZE 47K JA 1/16W
R866	401 024 6700	CARBON 100 JA 1/6W
R869	401 024 6700	CARBON 100 JA 1/6W
R870	401 105 2904	MT-GLAZE 22K JA 1/16W
R871	401 105 0603	MT-GLAZE 10K JA 1/16W
R872	401 026 1307	CARBON 27K JA 1/6W
R873	401 105 4205	MT-GLAZE 33K JA 1/16W
R874	401 105 0603	MT-GLAZE 10K JA 1/16W
R875	401 105 5400	MT-GLAZE 47K JA 1/16W
R877	403 157 7203	CERAMIC 3900P K 50V
R881	401 105 4106	MT-GLAZE 3.3K JA 1/16W
R882	401 105 4106	MT-GLAZE 3.3K JA 1/16W
R883	401 105 4205	MT-GLAZE 33K JA 1/16W
R886	401 105 2904	MT-GLAZE 22K JA 1/16W
R887	401 025 8208	CARBON 22K JA 1/6W
R888	401 105 5905	MT-GLAZE 560 JA 1/16W
R892	401 105 5509	MT-GLAZE 470K JA 1/16W
R893	401 105 8005	MT-GLAZE 1M JA 1/16W
R894	401 105 0405	MT-GLAZE 100 JA 1/16W
R896	401 105 0603	MT-GLAZE 10K JA 1/16W
R899	401 105 4205	MT-GLAZE 33K JA 1/16W
VARIABLE RESISTOR		
VR631	645 006 5125	VR, SEMI, 2K N
	652 000 0100	VR,SEMI,2K N
TRANSFORMER		
T431	652 001 1144	TRANS,DRIVE
⚠T471	645 057 4832	TRANS, FLYBACK
⚠T611	645 061 5221	TRANS,POWER,PULSE
COIL		
L171	645 049 3379	TRANS,OSC,38MHZ
	645 054 0271	TRANS,OSC,38MHZ
L431	610 031 9998	PIPE CORE
	645 018 7025	CORE,PIPE
	652 001 0475	PIPE CORE
L432	610 031 9998	PIPE CORE
	645 018 7025	CORE,PIPE
	652 001 0475	PIPE CORE
L441	610 210 8071	LINEARITY COIL
	645 060 9817	COIL,LINEARITY
⚠L601	645 019 3873	LINE FILTER
	645 058 8235	LINE FILTER
	652 000 1961	LINE FILTER
L603	645 018 9722	CORE,PIPE
	652 001 0123	CORE,PIPE
	652 001 0147	CORE,PIPE
L604	645 018 9722	CORE,PIPE
	652 001 0123	CORE,PIPE
	652 001 0147	CORE,PIPE
L605	645 005 0763	CORE,PIPE
L631	645 018 9722	CORE,PIPE
	652 001 0123	CORE,PIPE
	652 001 0147	CORE,PIPE
DIODE		
D031	407 149 0807	DIODE 1SS355-TE-17
D1001	407 063 9603	ZENER DIODE MTZJ9.1A
	407 057 9602	ZENER DIODE RD9.1EB1
	407 162 2703	ZENER DIODE UZ-9.1BCB
	408 048 0103	ZENER DIODE MTZJ9.1B
	408 048 0400	ZENER DIODE MTZJ9.1C-52
D1007	407 063 9603	ZENER DIODE MTZJ9.1A
	407 057 9602	ZENER DIODE RD9.1EB1
	407 162 2703	ZENER DIODE UZ-9.1BCB
	408 048 0103	ZENER DIODE MTZJ9.1B
	408 048 0400	ZENER DIODE MTZJ9.1C-52
D1017	407 063 9603	ZENER DIODE MTZJ9.1A
	407 057 9602	ZENER DIODE RD9.1EB1
	407 162 2703	ZENER DIODE UZ-9.1BCB
	408 048 0103	ZENER DIODE MTZJ9.1B
	408 048 0400	ZENER DIODE MTZJ9.1C-52
D102	407 099 5600	ZENER DIODE MTZJ6.8A
	407 057 4003	ZENER DIODE RD6.8EB1
	408 047 8605	ZENER DIODE MTZJ6.8A
D103	407 100 0204	ZENER DIODE MTZJ36A
	407 056 2307	ZENER DIODE RD36EB1
	408 047 6205	ZENER DIODE MTZJ36A
D122	407 166 1108	DIODE 1SS356-TW11
D1901	407 005 4505	DIODE DS442X
	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D1910	407 158 9204	LED SPR-39MVWF
D1910A	610 264 5064	HOLDER LED-S2CP
	610 273 7929	HOLDER LED-S4KF
	610 303 9954	HOLDER LED-C4LA
D249	407 099 6003	ZENER DIODE MTZJ9.1B
	407 057 9701	ZENER DIODE RD9.1EB2
D280	407 063 9306	ZENER DIODE MTZJ7.5C
	407 057 6304	ZENER DIODE RD7.5EB1
	408 047 9206	ZENER DIODE MTZJ7.5C
D352	407 063 8705	ZENER DIODE MTZJ5.1C
	407 056 9801	ZENER DIODE RD5.6EB1
	408 047 7103	ZENER DIODE MTZJ5.1C-52
D357	407 005 4505	DIODE DS442X
	408 008 2406	DIODE 1N4148

Ref. No.	Part No.	Description
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D3701	407 005 4505	DIODE DS442X
	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D3702	407 005 4505	DIODE DS442X
	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D421	407 099 7208	ZENER DIODE MTZJ16A
	407 054 7007	ZENER DIODE RD16EB1
	407 054 7205	ZENER DIODE RD16EB3
	408 047 5307	ZENER DIODE MTZJ16A-52
D467	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
	407 013 6508	DIODE 1S2471
D468	407 005 4505	DIODE DS442X
	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D476	407 063 8309	ZENER DIODE MTZJ11C
	407 054 1807	ZENER DIODE RD11EB3
	408 047 3204	ZENER DIODE MTZJ11C
D485	407 007 7405	DIODE EU1
D512	407 005 8602	DIODE ERA15-02-V1
D603	407 006 6300	DIODE ERC05-10BV1
D604	407 006 6300	DIODE ERC05-10BV1
D605	407 006 6300	DIODE ERC05-10BV1
D606	407 006 6300	DIODE ERC05-10BV1
⚠ D610	407 230 3908	PHOTO COUPLE PC123Y52
	407 231 7707	PC TLP421F(D4-BL)
D611	407 005 4505	DIODE DS442X
	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D613	407 099 5907	ZENER DIODE MTZJ8.2C
	407 057 8407	ZENER DIODE RD8.2EB3
	408 047 9800	ZENER DIODE MTZJ8.2C
D616	407 099 7901	ZENER DIODE MTZJ20B
	407 055 1806	ZENER DIODE RD20EB2
	408 047 5901	ZENER DIODE MTZJ20B-52
D617	407 006 0100	DIODE ERA-91-02
D618	407 005 4505	DIODE DS442X
	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D619	407 005 4505	DIODE DS442X
	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D631	407 009 8806	DIODE RU3AM
D632	407 211 6102	DIODE FE301-1L43
	407 129 6706	DIODE RU4YX LF-L1
D633	407 007 7603	DIODE EU2
	407 007 7801	DIODE EU2Z
D634	407 009 8905	DIODE RU3M
D661	407 099 6102	ZENER DIODE MTZJ10B
	407 054 0008	ZENER DIODE RD10EB2
	408 047 2306	ZENER DIODE MTZJ10B-52
D662	407 007 7405	DIODE EU1
D663	407 005 4505	DIODE DS442X
	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D664	407 149 0807	DIODE 1SS355-TE-17
D681	407 149 0807	DIODE 1SS355-TE-17
D683	407 005 4505	DIODE DS442X
	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D685	407 099 5600	ZENER DIODE MTZJ6.8A
	407 057 4003	ZENER DIODE RD6.8EB1
	408 047 8605	ZENER DIODE MTZJ6.8A
D686	407 099 5501	ZENER DIODE MTZJ6.2C
	407 057 2801	ZENER DIODE RD6.2EB3
	408 047 8308	ZENER DIODE MTZJ6.2C-52
D694	407 005 4505	DIODE DS442X
	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D861	407 055 7907	ZENER DIODE RD3.6EL
	408 041 2005	ZENER DIODE RD3.6EL
MISCELLANEOUS		
⚠ F601	423 028 8603	FUSE 250V 4A
	423 024 8409	FUSE 250V 4A
F601A	645 040 3576	HOLDER,FUSE
F601B	645 040 3576	HOLDER,FUSE
A101	645 057 2753	TUNER,U/V
	645 061 4132	TUNER,U/V
A1901A	645 047 6228	UNIT,REMOCON RECEIVER
K1001	652 001 2974	JACK,RCA-3
K1002	652 001 2974	JACK,RCA-3
K1003	652 001 2981	JACK,RCA-3
⚠ PS601	408 046 5407	TH PTDCA1BF4R5Q200
SW1901	645 003 4701	SWITCH,PUSH 1P-1TX1
	645 019 4887	SWITCH,PUSH 1P-1TX1
	645 027 7382	SWITCH,PUSH 1P-1TX1
SW1902	645 003 4701	SWITCH,PUSH 1P-1TX1
	645 019 4887	SWITCH,PUSH 1P-1TX1
	645 027 7382	SWITCH,PUSH 1P-1TX1
SW1903	645 003 4701	SWITCH,PUSH 1P-1TX1
	645 019 4887	SWITCH,PUSH 1P-1TX1
	645 027 7382	SWITCH,PUSH 1P-1TX1
SW1904	645 003 4701	SWITCH,PUSH 1P-1TX1
	645 019 4887	SWITCH,PUSH 1P-1TX1
	645 027 7382	SWITCH,PUSH 1P-1TX1
SW1905	645 003 4701	SWITCH,PUSH 1P-1TX1
	645 019 4887	SWITCH,PUSH 1P-1TX1
	645 027 7382	SWITCH,PUSH 1P-1TX1
SW1906	645 003 4701	SWITCH,PUSH 1P-1TX1
	645 019 4887	SWITCH,PUSH 1P-1TX1
	645 027 7382	SWITCH,PUSH 1P-1TX1
⚠ SW601	645 059 0061	SWITCH, POWER 1P-1TX1
⚠ VA601	407 171 2008	VARISTOR ERZV14D471
X161	421 009 4705	SAW F TSF6376U
X211	645 024 8818	OSC,CRYSTAL 4.433619MHZ
	652 001 0154	OSC,CRYSTAL 4.433619MHZ
X801	645 004 1938	OSC,CRYSTAL 32.768KHZ
	645 004 1945	OSC,CRYSTAL 32.768KHZ

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description

610 311 8949 ASSY,PWB,CRT C5RA 1AA0B10S1240B

TRANSISTOR

Q701	405 041 6507	TR 2SC2621-D-RA
	405 041 6705	TR 2SC2621-E-RA
	405 066 9903	TR 2SC2688(1)-K
	405 067 0008	TR 2SC2688(1)-L
	405 067 0107	TR 2SC2688(1)-M
Q703	405 041 6507	TR 2SC2621-D-RA
	405 041 6705	TR 2SC2621-E-RA
	405 066 9903	TR 2SC2688(1)-K
	405 067 0008	TR 2SC2688(1)-L
	405 067 0107	TR 2SC2688(1)-M
Q705	405 041 6507	TR 2SC2621-D-RA
	405 041 6705	TR 2SC2621-E-RA
	405 066 9903	TR 2SC2688(1)-K
	405 067 0008	TR 2SC2688(1)-L
	405 067 0107	TR 2SC2688(1)-M
Q721	405 001 7407	TR 2SA1015-O(SAN)
	405 001 7605	TR 2SA1015-Y(SAN)

CAPACITOR

C703	403 157 6800	CERAMIC	680P K 50V
C705	403 157 6602	CERAMIC	470P K 50V
C707	403 157 6602	CERAMIC	470P K 50V
C708	404 084 6505	CERAMIC	1000P K 2K
	403 077 2708	CERAMIC	1000P P 2K
	403 077 2807	CERAMIC	1000P Z 2K
	403 312 8304	CERAMIC	1000P Z 2K
C710	403 368 8907	ELECT	4.7U M 250V

RESISTOR

R701	401 105 1402	MT-GLAZE	150 JA 1/16W
R702	401 025 1308	CARBON	150 JA 1/6W
R704	401 105 1402	MT-GLAZE	150 JA 1/16W
R705	401 025 1308	CARBON	150 JA 1/6W
R707	401 105 1402	MT-GLAZE	150 JA 1/16W
R708	401 025 1308	CARBON	150 JA 1/6W
R710	401 057 3103	OXIDE-MT	0.22 JA 1W
R711	401 065 4604	OXIDE-MT	12K JA 2W
R712	401 065 4604	OXIDE-MT	12K JA 2W
R713	401 065 4604	OXIDE-MT	12K JA 2W
R715	401 009 1508	CARBON	2.7K JA 1/2W
R716	401 009 1508	CARBON	2.7K JA 1/2W
R717	401 009 1508	CARBON	2.7K JA 1/2W
R723	401 105 5301	MT-GLAZE	4.7K JA 1/16W
R724	401 026 9600	CARBON	470 JA 1/6W
R743	401 025 8208	CARBON	22K JA 1/6W

COIL

L702	645 007 9337	INDUCTOR,270U K

DIODE

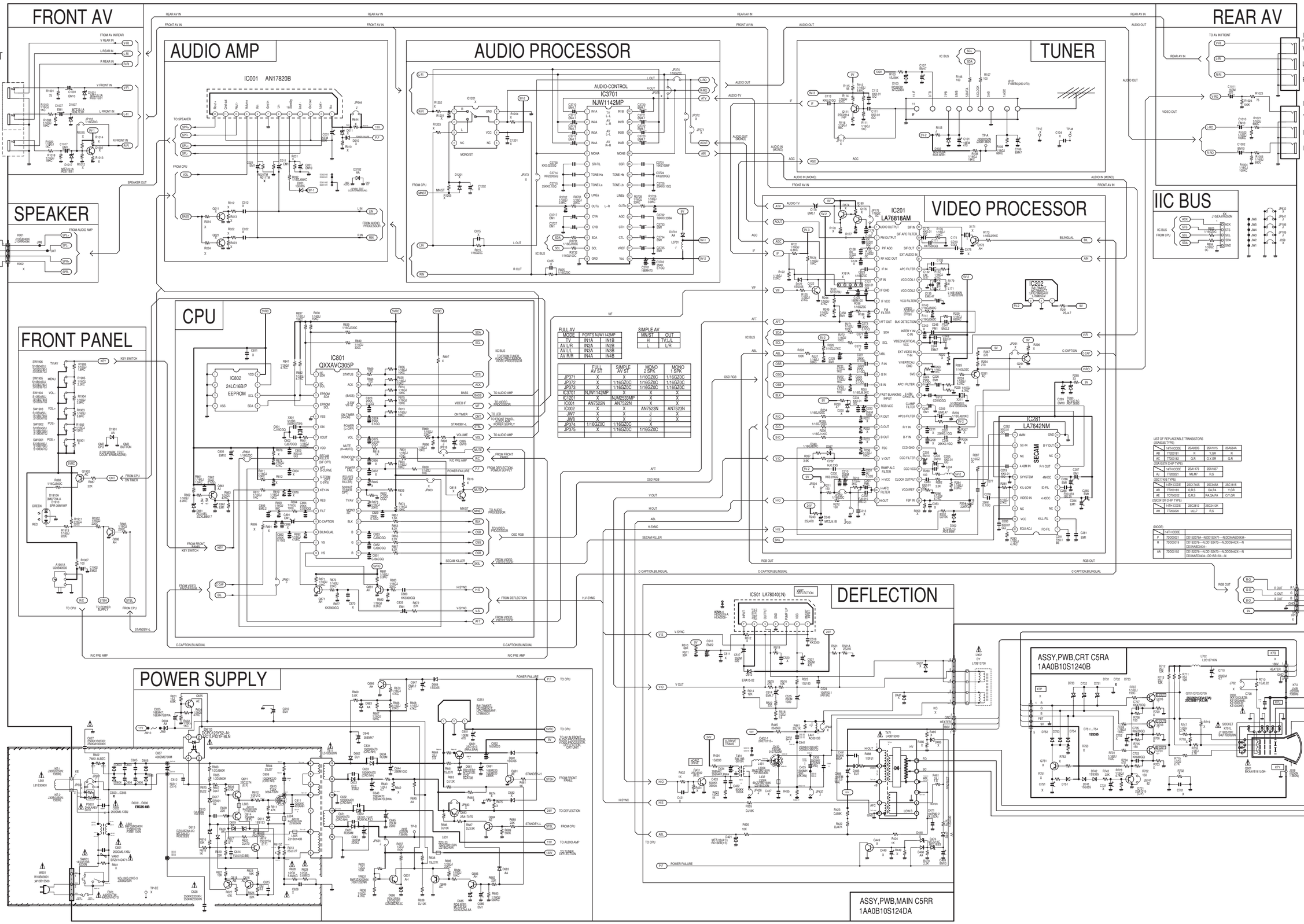
D741	407 149 0807	DIODE 1SS355-TE-17
D742	407 149 0807	DIODE 1SS355-TE-17

MISCELLANEOUS

⚠K701L	645 026 2005	SOCKET,CRT 8P
	652 001 0321	SOCKET,CRT 8P

A14800/Nov./'03/30 BB

SANYO Electric Co., Ltd.
Printed in Japan



FULL AV		
MODE	PORTS NJW1142MP	
TV	IN1A	IN1B
AV L/R	IN2A	IN2B
AV L/L	IN3A	IN3B
AV R/R	IN4A	IN4B

SIMPLE AV	
MN/ST	OUT
H	TV/L/L
L	L/R

	FULL AV ST	SIMPLE AV ST	MONO 2 SPK	MONO 1 SPK
JP371	X	X	1/16GZ0C	1/16GZ0C
JP372	X	1/16GZ0C	1/16GZ0C	1/16GZ0C
JP373	X	1/16GZ0C	1/16GZ0C	1/16GZ0C
IC3701	NJW1142MP	X	X	X
IC1201	X	NJM2533MP	X	X
IC001	AN7522N	AN7522N	X	X
IC002	X	X	AN7523N	AN7523N
JW7	X	X	J	X
JW8	X	X	J	X
JP374	1/16GZ0C	1/16GZ0C	X	
JP375	X	1/16GZ0C	1/16GZ0C	

LIST OF REPLACEABLE TRANSISTORS

(2SA6033 TYPE)

	14TH CODE	2SA6033	2SA1015	2SA564A
AB	77200181	R	R,GR	B
AC	77200182	Q,R	Q,Y,GR	Q,R

(2SA1037K CHIP TYPE)

	14TH CODE	2SA1179	2SA1037
AJ	77200221	MN,MT	R,S

(2SC1740S TYPE)

	14TH CODE	2SC1740S	2SC945A	2SC1815
AD	77200183	Q,R,S	QA,PA	Y,GR
AE	7D7D0002	Q,R,S	RA,QA,PA	O,Y,GR

(2SC2412K CHIP TYPE)

	14TH CODE	2SC2812	2SC2412K
AH	77200220	L,L,LT	R,S

(DIODE)

	14TH CODE	
P	7D0K0021	DD15207EA---N,DD15247I---N,DD0XAAE0043---
R	7D0K0019	DD15207A---N,DD15247I---N,DD0SB442K---N DD0AAE0043---
AA	7D0D0192	DD15207I---N,DD15247I---N,DD0SB442K---N DD0AAE0043K--,DD15R13I---N

THE SERVICE PRECAUTION:

The area enclosed by this line(⅃⅃⅃) is directly connected with AC mains voltage. When servicing the area, connect an isolating transformer between TV receiver and AC line to eliminate hazard of electric shock.

PRODUCT SAFETY NOTICE:

Product safety should be considered when a component replacement is made in any area of a receiver.

Components indicated by a mark ⚠ in this circuit diagram show components whose values have special significance to product safety. It is particularly recommended that only parts specified on the part service manual be used for components replacement pointed out by the mark.

CIRCUIT DIAGRAM NOTICE:

1. All resistance value are in ohms, K=1,000, M=1,000,000.
2. All resistance rated wattages are 1/6W unless otherwise noted.
3. Excepting electrolytic capacitors, all capacitance values of less than 1 are expressed in μ F and more than 1 are pF.
4. All capacitance rated voltages are 50V unless otherwise noted.
5. All inductance values are in μ H.
6. Voltage readings take with a "VTVM" are from point indicated chassis ground. Voltage readings taken by using PAL colour bar signal are with all controls at normal position. Some voltage may vary with signal strength.
7. Waveform were taken with PAL colour bar and controls adjusted for normal picture. Waveforms were taken by using a wide band oscilloscope and a low capacity probe.
8. This circuit diagram covers a basic or representative chassis only. There may be some components or partial circuit differences between the actual chassis and the circuit diagram.
9. Parts specified with "X" are not installed in this model.
10. Parts specified with "J" are just jumper wires.
11. Expression of capacitance and resistance in circuit diagrme.

Capacitance (Example)

1000 C M 2000 D

- Characteristic
- Capacitance value (220pF)
- Allowable error (±20%)
- Kind (Ceramic)
- Rated voltage (1,000V)

J= ± 5%
K= ±10%
M= ±20%

T, A, U, D: Electrolytic
C, K, B: Ceramic
F: Mylar film
M, N: Polypropylene
Z: Metalized paper

Resistance (Example)

1/2 N J 1.2

- Resistance value (1.2Ω)
- Allowable error (±5%)
- Kind (M.carbon)
- Rated wattage (1/2W)

D: Carbon
N: Metalized carbon
S: Oxied metalized
W: Wire wounding
C: Solid

TRANSISTOR, DIODE AND INTEGRATED CIRCUIT TERMINAL GUIDE

C: COLLECTOR
B: BASE
E: EMITTER

A: ANODE
K: KATHODE

CHIP COMPONENTS
TRANSISTOR
DIODE
RESISTOR

PARTICULAR PARTS SYMBOL
FUSIBLE RESISTOR
NON POLE ELECTRIC CAPACITOR
POSISTER

SANYO

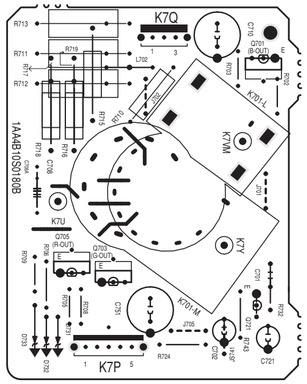
COLOUR TELEVISION

AC5-G1 CHASSIS SERIES

SERVICE REF. NO.
CM21KX81/A-00
CM21LX81/A-00
CM21MX81/A-00

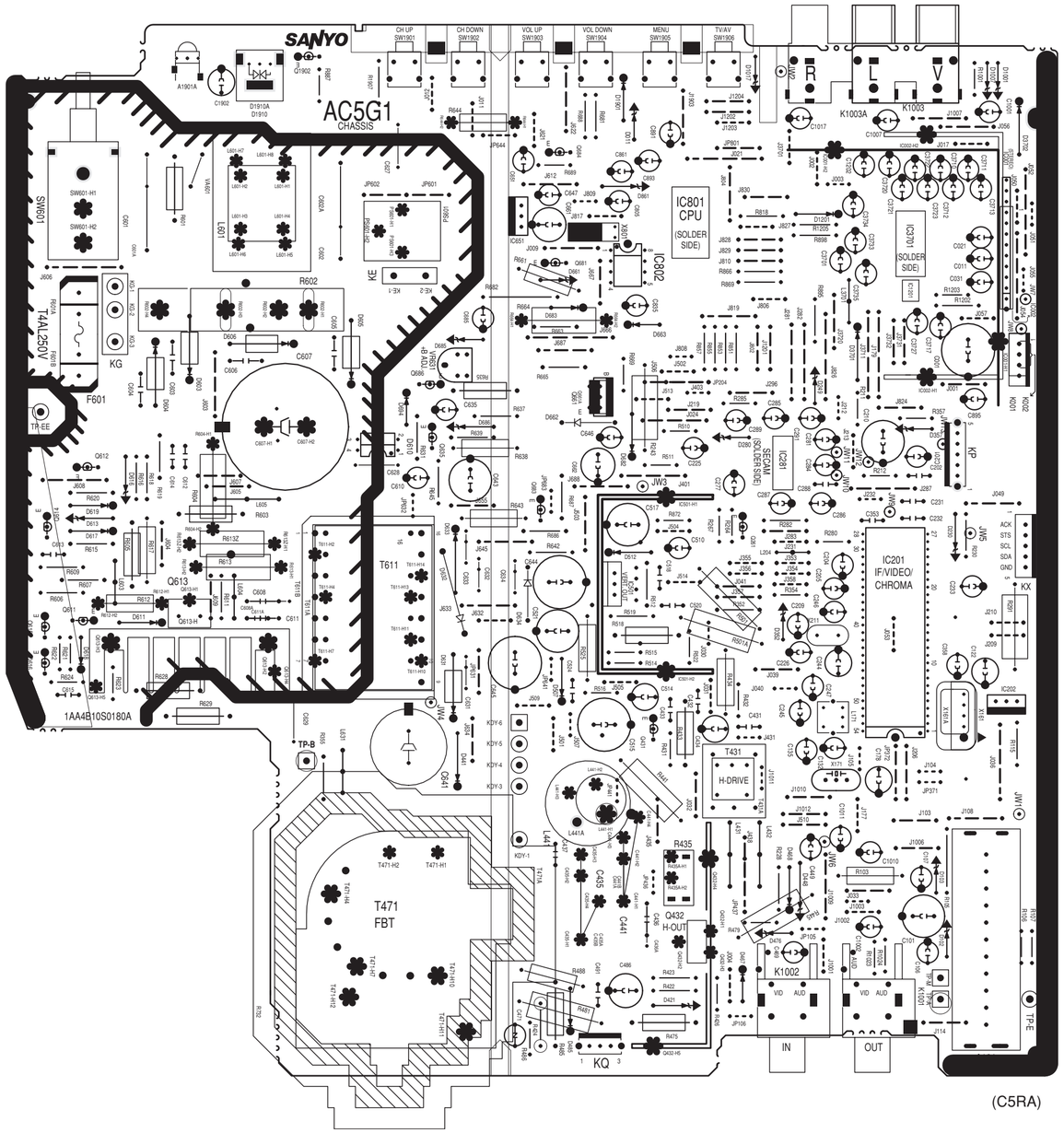
C4VW/C4VWA/C5RR/C5RRA/C6YR/C6YRA

CRT BOARD (Component Location)



(C5RA)

MAIN BOARD (Component Location)



(C5RA)

Waveforms & Voltages

(On the Main Board)

IC001 (AUDIO AMP.)

Pin-1 12.7V	**2** 5.9V	**3** GND	**4** 5.9V	**5** 6.8V	**6** 1.5V	**7** GND	**8** 1.5V	**9** 0.4V	
10 5.9V	**11** GND	**12** 5.9V							

IC201 (IF/VIDEO/CHROMA)

Pin-1 2.3V	**2** 2.2V	**3** 2.5V	**4** 2.2V	**5** 2.9V	**6** 2.9V	**7** 0V	**8** 5.0V	**9** 2.5V	
10 1.6V	**11** 4.1V	**12** 3.8V	**13** 4.3V	**14** 1.6V	**15** 1.7V	**16** 1.6V	**17** 0V	**18** 8.3V	
19 2.6V	**20** 2.5V	**21** 2.5V	**22** 2.0V	**23** 2.5V	**24** 2.7V	**25** 5.2V	**26** 2.6V	**27** 0.9V	
28 1.3V	**29** 1.7V	**30** 0.9V	**31** 4.5V	**32** 8.4V	**33** 0V	**34** 2.5V	**35** 2.5V	**36** 3.2V	
37 1.9V	**38** 2.8V	**39** 3.5V	**40** 2.5V	**41** 0V	**42** 2.5V	**43** 5.0V	**44** 2.7V	**45** 2.5V	
46 2.3V	**47** 4.2V	**48** 4.1V	**49** 4.1V	**50** 2.5V	**51** 2.2V	**52** 2.0V	**53** 2.2V	**54** 3.1V	

IC202

Pin-1 7.8V	**2** GND	**3** 5.0V

IC651

Pin-1 11.8V	**2** GND	**3** 5.0V

IC281 (SECAM DECODER)

Pin-1 3.7V	**2** 5.7V	**3** N.C.	**4** 5.8V	**5** 6.5V	**6** 5.0V	**7** 4.0V	**8** N.C.	**9** 4.0V	
10 GND	**11** 3.9V	**12** 1.2V	**13** N.C.	**14** 3.9V	**15** 0V	**16** 4.8V	**17** 3.7V	**18** N.C.	
19 7.6V	**20** 0V								

IC3701 (AUDIO CONTROL & SURROUND)

Pin-1 4.2V	**2** 4.2V	**3** 4.2V	**4** 4.2V	**5** 4.3V	**6** 4.3V	**7** 4.3V	**8** 4.3V	**9** -	
10 4.3V	**11** 2.8V	**12** 2.8V	**13** 4.2V	**14** 3.9V	**15** GND	**16** 8.5V	**17** 4.2V	**18** 3.2V	
19 4.0V	**20** 0.6V	**21** 4.2V	**22** 4.2V	**23** 4.3V	**24** 4.3V	**25** 0.5V	**26** 4.3V	**27** 4.3V	
28 4.2V	**29** 4.2V	**30** 4.2V							

IC501 (VERT. OUT)

Pin-1 3.0V	**2** 26.0V	**3** 2.6V	**4** GND	**5** 17.0V	**6** 26.5V	**7** 3.0V

IC802 (MEMORY)

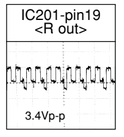
Pin-1 GND	**2** GND	**3** GND	**4** GND	**5** 5.0V	**6** 5.0V	**7** GND	**8** 5.0V

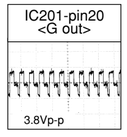
IC801 (CPU)

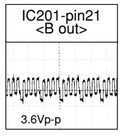
Pin-1 4.3V	**2** 3.9V	**3** 5.0V	**4** 5.0V	**5** GND	**6** 1.9V	**7** 2.6V	**8** 5.0V	**9** -	
10 1.6V	**11** 5.0V	**12** 0V	**13** 5.0V	**14** 3.4V	**15** 5.0V	**16** 0V	**17** 4.8V	**18** 4.2V	
19 0V	**20** 0V	**21** 0V	**22** 0V	**23** 5.0V	**24** 0V	**25** 5.0V	**26** -	**27** 3.2V	
28 5.0V	**29** 0V	**30** 1.6V	**31** 4.9V	**32** 5.0V	**33** 5.0V	**34** 0V	**35** 5.0V	**36** 5.0V	

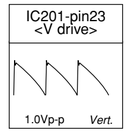
Q111	**Q122**	**Q173**	**Q1902**	**Q261**	**Q431**	**Q432**	**Q611**	**Q612**	**Q613**	**Q614**	**Q615**	**Q616**
B 1.2V	B 0.6V	B 0V	B 5.0V	B 2.3V	B 0.3V	B 0V	B 3.7V	B 0.2V	B 4.1V	B 3.7V	B 0.1V	B 0.7V
C 5.4V	C 0V	C 0.4V	C -0.4V	C 0V	C 12.6V	C 132.9V	C 28.8V	C 3.7V	C 325V	C 0V	C 0.2V	C 0V
E 0.5V	E 0V	E 0V	E 5.0V	E 3.0V	E 0V	E 0V	E 4.1V	E 0V	E 0V	E 4.1V	E 0V	E 0V

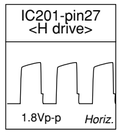
Q631	**Q635**	**Q661**	**Q666**	**Q681**	**Q683**	**Q684**	**Q685**	**Q686**	**Q861**	**Q871**	**Q881**	**Q886**
B 6.8V	B 3.2V	B 9.9V	B -0.6V	B 0V	B 25.4V	B 0.7V	B 0.6V	B 24.5V	B 4.4V	B -0.1V	B -0.3V	B 0.7V
C 24.5V	C 24.5V	C 10.2V	C 11.7V	C 9.9V	C 26.0V	C 0V	C 24.4V	C 0V	C 5.0V	C 4.8V	C 4.2V	C 0V
E 6.3V	E 3.2V	E 9.2V	E 0V	E 0V	E 26.1V	E 0.7V	E 0.2V	E 24.5V	E 5.0V	E 0V	E 0V	E 0V

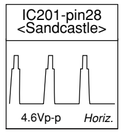


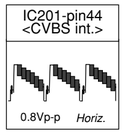


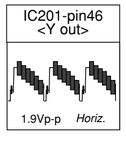


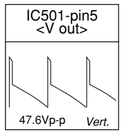


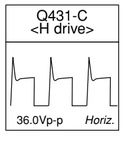


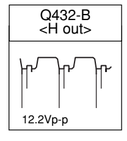


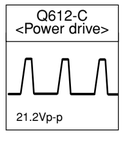


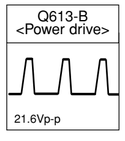


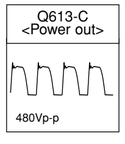


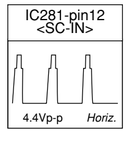


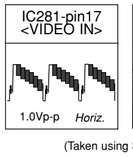


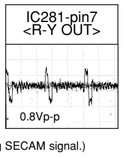


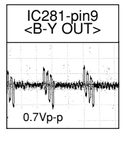








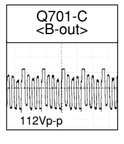


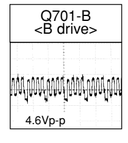


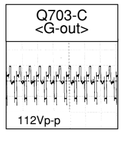
(Taken using SECAM signal.)

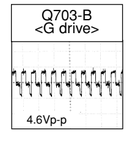
(On the CRT Board)

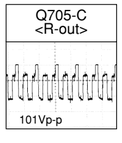
Q701	**Q703**	**Q705**	**Q721**
B 2.5V	B 2.5V	B 2.6V	B 1.6V
C 157.1V	C 152.5V	C 150.2V	C GND
E 2.4V	E 2.5V	E 2.5V	E 2.0V

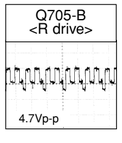












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C5RR/A
C4VW/A